



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

Mr. Rodney R. McInnis
Regional Administrator
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, California

JUN 25 2013

Dear Mr. McInnis:

This letter requests your agency's concurrence with our "may affect, but not likely to adversely affect," determination of the effects of the Sutter Basin Pilot Feasibility Study (SBPFS) on the Federally listed Central Valley spring-run Chinook salmon (*Onorhynchus tshawytscha*), Sacramento River winter-run Chinook salmon *O. tshawytscha*; Central Valley steelhead (*O. mykiss*), and the North American green sturgeon (*Acipenser medirostris*) and their designated critical habitats pursuant to Section 7(a) of the Endangered Species Act, as amended.

The work would involve modifying approximately 41 miles of the Feather River west levee to reduce flood damages, and risk to public safety. The levee modifications would involve (1) installing approximately 37 miles of soil and bentonite cutoff walls (2) constructing 2.46 miles of seepage berms, (3) placing 0.39 miles of irrigation canal ditch fill, and (4) relocating levees or removing encroachments along approximately 0.41 miles of the Feather River west levee system. When completed, the work would eliminate or reduce levee deficiencies resulting from through- and under-seepage, slope instability, erosion, and encroachments within the construction footprint. Details of the project design are provided in the Sutter Basin Pilot Feasibility Draft Report – Draft Environmental Impact Report/Supplemental Environmental Impact Statement (CD enclosed). The Biological Assessment (BA) is also enclosed.

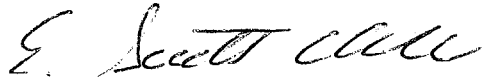
Based on the enclosed BA, there would be no direct effect on the designated critical habitat for the Chinook salmon, steelhead, and green sturgeon since all work would be located above the ordinary high water mark. Vegetation loss would be confined to the construction footprint and to a waterside easement necessary for compliance with the Corps' levee vegetation policy. No adverse modification of riparian vegetation or shaded riverine aquatic cover would occur within the designated critical habitat areas of these listed fish species.


Construction of the project would impact about 44 acres of riparian forest and shrub scrub habitat. Approximately 891 trees (mixed native riparian) would be removed from the waterside levee slope and toe above the ordinary high water mark. No in-water construction would occur. Most of these areas are set well back from the west side of the river, ranging from approximately 20 to 5,600 feet from the Feather River during typical summer base flows. A mitigation and monitoring plan accompanies the BA. The plan details compensation for loss of riparian habitat to ensure no net loss of woody riparian habitat functions and values.

We have also determined that this project would have no direct effects on Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Management Act, and no further EFH consultation is needed for this project. In addition, the project would implement numerous measures to avoid and/or minimize any effects of the project on the Federally-listed fish species. These conservation and mitigation measures are listed in the BA and in Chapter 4.9 in the draft EIR/SEIS on the enclosed CD.

Based on the information in the letter and enclosure, we request your agency's concurrence with our determination that the SBPFS "may affect, but not likely to adversely affect," the Federally listed Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, Central Valley steelhead, and the North American green sturgeon and their designated critical habitats. If you have any questions or need additional information, please contact Mr. Brad Johnson, Environmental Manager, at (916) 557-7812 or email: Bradley.C.Johnson@usace.army.mil. Thank you for your attention to this matter.

Sincerely,



 Alicia E. Kirchner
Chief, Planning Division

Enclosure

Copy furnished (w/encl):

Mr. Howard Brown, NOAA National Marine Fisheries Service, 650 Capitol Mall, Suite 5-100, Sacramento, CA 95814

Mr. Mike Hendrick, NOAA National Marine Fisheries Service, 650 Capitol Mall, Suite 5-100, Sacramento, CA 95814



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

SEP 26 2013

In response refer to:
2013/9685

E. Scott Clark
Acting Chief, Planning Division
Department of Army
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Dear Mr. Clark:

This letter is in response to your August 30, 2013, request for initiation of section 7 consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*), concerning the Sutter Basin Pilot Feasibility Study (SBPFS). The SBPFS, located in Sutter and Butte counties, California, evaluates alternatives to reduce flood risk in the Sutter Basin.

The U.S. Army Corps of Engineers (Corps) has determined that the proposed project may affect, but is not likely to adversely affect federally listed as threatened Central Valley (CV) spring-run Chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU), endangered Sacramento River winter-run Chinook salmon (*O. tshawytscha*) ESU, threatened California CV (CCV) steelhead (*O. mykiss*) distinct population segment (DPS), threatened Southern DPS of North American green sturgeon (*Acipenser medirostris*), and their designated critical habitats. This letter also serves as consultation under the authority of, and in accordance with, the provisions of the Fish and Wildlife Coordination Act of 1934 (FWCA), as amended.

I. Consultation to Date

The following is a summary of the NMFS consultation activities on the proposed project:

- (1) On June 27, 2013, the Corps submitted a letter to NMFS requesting concurrence with a "may affect, but not likely to adversely affect," determination to effects from the SBPFS.
- (2) On August 21, 2013, NMFS submitted an insufficiency letter to the Corps. This letter outlined various deficiencies in the biological assessment (BA) that was included with the Corps' June 27 consultation package.
- (3) In response to NMFS' August 21, 2013, letter, on August 30, 2013, the Corps delivered a revised BA and initiation letter for the SBPFS. The revised letter requests NMFS concurrence with a "may affect, not likely to adversely affect" determination.



II. Project Description

The SBPFS is being conducted in partnership with the Sutter-Butte Flood Control Agency (SBFCA) and the State of California Central Valley Flood Protection Board (CVFPB). The primary purpose of the SBPFS is flood risk management. A high risk of flooding exists from levee failure that threatens the public safety of approximately 80,000 people, as well as property and infrastructure throughout the Sutter Basin area.

The proposed project includes:

- (1) Construction of 2,250 linear feet of seepage berm and cutoff walls;
- (2) Relocation of 1,683 linear feet of the Sutter Butte Canal;
- (3) Realignment of 11,000 linear feet of levee along the Sutter Butte Canal;
- (4) Installation of 7,660 linear feet of landside levee slope erosion protection matting; and
- (5) Removal of about 30 acres (includes orchard removal) of waterside trees and shrubs within the construction footprint and to conform with the U.S. Army Corps of Engineers (Corps) Engineering Technical Letter No. 1110-2-571 *Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures* (ETL). This includes the removal of 2,814 riparian trees.
- (6) Compensation for permanent and temporary losses of woody riparian vegetation will be achieved through offsite compensation. The Corps proposes to conduct offsite compensation for riparian impacts in the existing 48.5-acre Star Bend Conservation Area, located within the setback area adjacent to the west levee of the Feather River, approximately 6 miles south of Yuba City. This will include the following actions:
 - a. To compensate for the loss of riparian vegetation and the loss of riverine function, the Corps will compensate for the loss of 30 acres of riparian habitat at a 3:1 ratio. This will be accomplished by planting at a combination of Star Bend Conservation Area and other NMFS approved areas within the proposed action area. If appropriate land is not available, a NMFS approved riparian conservation bank may be allowed.
 - b. The acreage compensation must include appropriate space to compensate for the loss of 2,814 riparian trees at a 3:1 ratio. The planting palette and location must be NMFS approved prior to the initiation of any proposed SBPFS activities. If the above designated acreage will not suitably allow for the compensation of the loss of 2,814 trees, offsite mitigation may be used with NMFS approval.
 - c. To help ensure that there is limited temporal habitat damage to riparian habitat, the vegetation planting will be initiated prior to the start of any vegetation removal associated with the proposed project.
- (7) Success criteria for the revegetated sites are described in the Monitoring and Mitigation Plan associated with the SBPFS BA.

III. Action Area

The regulations governing consultations under the ESA define *action area* as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (51 FR 19957). The action area should be determined based on all direct and indirect effects of the proposed action (50 CFR 402.02 and 402.14(b)(2)).

The proposed action area consists of the 41-mile corridor along the west levee of the Feather River from the Thermalito Afterbay to approximately 4 miles north of the Sutter Bypass. The proposed action area includes the project construction area and a 100-foot buffer around this area. The proposed construction area is defined as the area in which levee improvements (seepage berms, stability berms, relief wells, and slurry cutoff walls) are likely to be constructed. All of the potential direct and indirect effects will occur within this area and the 100-foot buffer around this area.

The proposed action area also includes the Three River Levee Improvement Authorities (TRLIA) Feather River Floodway Corridor Restoration Project Site located on the east bank of the Feather River. The TRLIA site is proposed as a compensation site for the loss of riparian habitat resulting from removal of vegetation necessary to comply with the Corps ETL.

IV. Effects of Proposed Action

All federally listed fish species potentially found in the area of the proposed project, the CV spring-run Chinook salmon ESU, CCV steelhead DPS, and Southern DPS of North American green sturgeon, have life histories, biological and habitat requirements that may be impacted by the proposed project. The Sacramento River winter-run Chinook salmon ESU is not found within the proposed project's action area; therefore there will be no impacts to this ESU or its designated critical habitat.

The proposed action area of the SBPFS provides migratory habitat for adult CV spring-run Chinook salmon, and migratory and rearing habitat for juveniles. Based on observations in the Feather River, adults are likely to be present in the proposed action area between February and July as they migrate to summer holding habitat. The proposed action area of the SBPFS borders the designated critical habitat of CV spring-run Chinook salmon in the Feather River. Primary constituent elements (PCEs) of critical habitat in the adjacent reaches of the Feather River include: (1) freshwater rearing sites that have adequate water quality and quantity, floodplain connectivity, and natural cover that supports juvenile growth and mobility, and (2) freshwater migration corridors that support adequate water quantity and quality as well as natural cover to provide food and migration pathways for juveniles as well as adults. Critical habitat includes the river channel and lateral extent as defined by the ordinary high water line. In areas where the ordinary high water line has not been defined, the lateral extent is defined by the bankfull elevation or the elevation at which water begins to leave the channel and move on to the floodplain (this generally corresponds to a discharge that generally has a recurrence interval of one to two years on the annual flood series) (70 FR 52488).

The proposed action area of the SBPFS provides migratory habitat for adult steelhead, and migratory and rearing habitat for juveniles. Adult steelhead immigration in the Feather River occurs from September through March (SWRI 2003). The proposed action area of the FRWLP borders the designated critical habitat of CCV steelhead in the Feather River, which includes the river channel and lateral extent as defined by the ordinary high water line. The PCEs of critical habitat are as described for spring-run Chinook salmon.

The proposed action area provides migratory and foraging habitat and likely spawning habitat for green sturgeon (Beamesderfer et al. 2004; Seesholtz pers. comm.). Historical sightings of adult green sturgeon in the Feather River have been in the spring during the general period of upstream migration in the Sacramento River. The proposed action area of the SBPFS borders designated critical habitat of the Southern DPS of North American green sturgeon, which includes the Feather River upstream to Oroville Dam.

Freshwater PCEs for the Southern DPS of North American green sturgeon include sufficient food resources for juvenile foraging, growth, and development; suitable substrates for egg incubation and development; suitable water quantity and quality for normal behavior, growth, and survival of all life stages; suitable passage conditions for adults, larvae, and juveniles; suitable holding pools and water depths for adults; and sediments free of elevated levels of contaminants capable of adversely affecting green sturgeon (74 FR 52300).

The Corps has determined that there will be no direct effect on the designated critical habitat for federally listed fish species, because all work on the waterside slope will stay above the ordinary high water mark (OHWM) and outside of designated critical habitat. Vegetation losses will be attributed to the construction footprint and as a result of the Corps ETL. As a result, there will be modification of riparian vegetation within the proposed action area, but none of this removal will occur in designated critical habitat of federally listed fish species.

Direct effect to riparian vegetation will include the removal of 2,814 trees. This includes both native (1,178) and non-native (1,636) trees. Of the 1,178 native trees, 957 of these are located on the waterside of the levee prism. There will also be 574 non-native trees removed on the waterside of the levee prism. A majority of these are orchard trees. The only vegetation allowed under the Corps ETL in the vegetation free zone will be non-irrigated perennial grasses. To help compensate for permanent and temporary loss of woody riparian vegetation, the Corps developed a mitigation and monitoring plan (MMP).

Proposed construction and levee repair activities are not likely to result in adverse turbidity- or sedimentation-related effects on winter-run Chinook salmon, spring-run Chinook salmon, steelhead, and green sturgeon or their critical habitat. For the SBPFS, no in-river construction activities are proposed and all activities that will result in physical disturbance or removal of soil or vegetation on the waterside slope of the levee will be limited to areas above the OHWM. With implementation of the stormwater pollution prevention plan (SWPPP) and the associated erosion and sediment control best management practices (BMPs), exposed or imported soil will be largely contained within the immediate project footprint and stabilized using structural or vegetative methods. Any increases in turbidity and sedimentation attributable to the proposed project are expected to be well below levels associated with injury or reduced growth of juvenile

salmonids, and will not likely result in significant disruption of normal feeding, sheltering, and migratory behavior of Chinook salmon, steelhead, or green sturgeon.

Contaminants used at construction sites, including gasoline, diesel fuel, lubricants, and hydraulic fluid, could enter the Feather River as result of spills or leakage from machinery or storage containers and injure or kill listed salmon, steelhead, and sturgeon. These substances can kill aquatic organisms through exposure to lethal concentrations or exposure to non-lethal levels that cause physiological stress and increased susceptibility to other sources of mortality such as predation. There is also a slight risk of the release of bentonite into the Feather River during jet grouting or deep soil mixing used to construct slurry cut off walls. Implementation of a spill prevention, control, and countermeasure plan (SPCCP) and bentonite slurry spill contingency plan as part of the environmental commitments of the project is anticipated to minimize the potential for toxic or hazardous spills or discharges into the Feather River. Adherence to all preventative, contingency, and reporting measures in the approved plans will reduce the risk of injury or mortality of listed fish species to negligible levels.

For the SBPFS, sheet piles will be used only as a site-specific treatment at roadway or railroad crossings, and will be restricted to the levee crown above the OHWM where sound waves will be expected to attenuate quickly before reaching the Feather River. Consequently, pile driving activities will have negligible noise and vibration effects on fish in the Feather River.

The SBPFS is proposing to relocate the Sutter Butte Main Canal levee 20 feet towards the Feather River for a total of 11,850 linear feet. Relocating levees closer to the river will reduce space for river meanders, limit the ability to reconnect floodplains, decrease the transport and deposition of sediment, and decrease the diversity of riverine and floodplain habitats. This will also limit the ability to support agriculture within expanded floodways. The move of the levee towards the river will decrease the ability to enhance juvenile rearing habitat (e.g., food resources and cover) by decreasing the connectivity of riparian areas and floodplain ecosystems that contribute to food web productivity.

V. ESA Section 7 Consultation

Based on our review of the material provided with your request and the best scientific and commercial information currently available, NMFS concurs that the Corps determination that the proposed project as described is not likely to adversely affect federally listed CV spring-run Chinook salmon ESU (*O. tshawytscha*), Sacramento River winter-run Chinook salmon ESU (*O. tshawytscha*), CCV steelhead DPS (*O. mykiss*), Southern DPS of North American green sturgeon (*Acipenser medirostris*), or their designated critical habitats. No construction activities are proposed in-river or below the OHWM; all activities that will result in physical disturbance and removal of vegetation on the waterside slope of the levee will be limited to areas above OHWM. The proposed project is not likely to result in adverse water quality or noise effects on listed fish species or their critical habitat. The proposed project is not likely adversely affect PCEs of critical habitat of winter-run Chinook salmon, spring-run Chinook salmon, steelhead, and green sturgeon. There will be no direct physical impacts to riparian vegetation or SRA cover within the designated critical habitat of these species. Therefore, no physical modification of critical

habitat for ESA-listed fish species will be expected because all proposed construction activities will occur above the OHWM of the Feather River.

In addition to the above, NMFS reached this determination based on the incorporation of the following measures into the project description:

- (1) Construction personnel will receive worker environmental awareness training. This training will instruct workers to recognized sensitive species and their habitats.
- (2) Erosion control BMPs and a SWPPP will be implemented to address and minimize water quality issues.
- (3) Where suitable habitat is present for listed species, the Corps will clearly delineate the construction limits through the use of survey tape, pin flags, orange barrier fencing, or other means, and prohibit any construction-related traffic outside these boundaries.
- (4) If a sensitive species is encountered by a biological monitor during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the species will not be harmed.
- (5) Implementation of a spill prevention, control, and countermeasure plan and bentonite slurry spill contingency plan is anticipated to minimize the potential for toxic or hazardous spills or discharges into the Feather River.
- (6) To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service vehicles or construction equipment outside designated staging areas unless it is done offsite.
- (7) The biological monitor will record all observations of federally listed species on California Natural Diversity Database field sheets and submit to the Corps, NMFS, U.S. Fish and Wildlife Service, and California Department of Fish and Wildlife.
- (8) Because ground disturbance for the proposed project will be greater than one acre, the Corps will obtain coverage under the U.S. Environmental Protection Agency's (EPA's) National Pollutant Discharge Elimination System general construction activity stormwater permit.
- (9) The specific BMPs that will be incorporated into the erosion and sediment control plan and SWPPP will be site-specific and will be prepared by the construction contractor in accordance with the California Regional Water Quality Control Board Field Manual.

This concludes ESA section 7 consultation for the proposed project. This concurrence does not provide incidental take authorization pursuant to section 7(b)(4) and section 7(o)(2) of the ESA. Re-initiation of the consultation is required where discretionary Federal agency involvement or control over the proposed project has been retained (or is authorized by law), and if: (1) new information reveals effects of any of the proposed projects that may affect listed species or critical habitat in a manner or to an extent not considered; (2) any of the proposed projects are subsequently modified in a manner that causes adverse effects to listed species or critical habitat; or (3) a new species is listed or critical habitat designated that may be affected by any of the proposed projects.

Section 7(a) (1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Conservation measures are discretionary agency activities intended to

minimize or avoid adverse effects of a proposed project on listed species or critical habitat, to help implement recovery plans, or to develop information. In order to fulfill the requirements of section 7(a)(1), NMFS recommends the Corps implement the conservation recommendations that are described below in section VIII.

VI. EFH Consultation

With regards to essential fish habitat (EFH) consultation, the proposed action area has been identified as EFH for Pacific salmon in Amendment 14 of the Pacific Salmon Fishery Management Plan pursuant to the Magnuson – Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Federal action agencies are mandated by the Magnuson-Stevens Act (section 305(b)(2)) to consult with NMFS on all actions that may adversely affect EFH, and NMFS must provide EFH conservation recommendations to those agencies (section 305(b)(4)(A)). Based on our review of the material provided, and the best scientific and commercial information currently available, NMFS has determined that the proposed action will adversely affect EFH for Pacific salmon. Therefore, NMFS is providing conservation recommendations to minimize or avoid these adverse effects in section VIII, below.

Section 305(b)(4)(B) of the Magnuson-Stevens Act requires the Corps to provide NMFS with a detailed written response within 30 days, and 10 days in advance of any action, to the EFH conservation recommendations, including a description of measures adopted by the Corps for avoiding, minimizing, or mitigating the impact of the project on EFH (50 CFR §600.920[j]). In the case of a response that is inconsistent with our recommendations, the Corps must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the proposed action and the measures needed to avoid, minimize, or mitigate such effects.

VII. FWCA Consultation

The purpose of the FWCA is to ensure that wildlife conservation receives equal consideration and is coordinated with other aspects of water resources development (16 U.S.C. 661). The FWCA establishes a consultation requirement for Federal departments and agencies that undertake any action that proposes to modify any stream or other body of water for any purpose, including navigation and drainage (16 U.S.C. 662(a)). Consistent with this consultation requirement, NMFS provides recommendations and comments to Federal action agencies for the purpose of conserving fish and wildlife resources. The FWCA provides the opportunity to offer recommendations for the conservation of species and habitats beyond those currently managed under the ESA and Magnuson-Stevens Act. FWCA recommendations are provided in section VIII, below.

VIII. Conservation Recommendations

Section 7(a) (1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Conservation measures are discretionary agency activities intended to minimize or avoid adverse effects of a proposed project on listed species or critical habitat, to

help implement recovery plans, or to develop information. In order to fulfill the requirements of section 7(a)(1), NMFS recommends, under section 7(a)(1) of the ESA, section 305(b)(4)(A) of the Magnuson-Stevens Act, and pursuant the FWCA, that the Corps implement the following recommendations as conservation measures:

- (1) As the Corps continues to develop details of the proposed action and moves beyond the 30 percent design stage, strong consideration should be given to revising proposed levee alignments to avoid or further minimize waterside construction. NMFS recognizes that the Corps negotiated the existing levee alignment with the U.S. Fish and Wildlife Service without the participation of NMFS. Our position is that if NMFS had been involved during the development of the Feasibility Study, we would have made a strong recommendation to avoid waterside re-alignment. Regardless of the analytical outcome of the Corps BA and the concurrence by NMFS that the proposed alignment is not likely to adversely affect listed species or designated critical habitat because the existing floodplain is broad and above the OHWM, the cumulative effects (as defined under NEPA) of such actions are likely to result in incremental loss of habitat that will eventually harm listed species.
- (2) The Corps should consider options other than strict adherence to the ETL. We recommend that, at a minimum, the Corps should issue itself a variance that allows trees to remain along the levee under certain circumstances. Our preferred recommendation is for the Corps to follow the vegetation approach that is a part of the Central Valley Flood Protection Plan (CVFPP). On June 29, 2012, the CVFPB adopted the CVFPP, a comprehensive new framework for systemwide flood management and flood risk reduction in the CV. The CVFPP proposes a State Systemwide Investment Approach for sustainable, integrated flood management. In 2009, the California Levees Roundtable signed the California's Central Valley Flood System Improvement Framework (Levees Framework Agreement). This Framework included interim criteria for managing vegetation on levees for visibility (inspections) and accessibility (floodfight and maintenance) with the expectation that a comprehensive strategy would be developed and included in the 2012 CVFPP. A full Levee Vegetation Management Strategy is included in the Conservation Framework of the CVFPP. The 2012 CVFPP describes implementation of the State's approach to levee vegetation management, which will be adaptive and responsive to:
 - a. The results of ongoing and future research, and
 - b. Knowledge gained from levee performance during high water events.

The CVFPP Levee Vegetation Management Strategy reflects a flexible and adaptive management strategy that meets public safety goals, and protects and enhances sensitive habitats in the CV. This strategy also reflects a prudent use of limited public resources in addressing flood risk. Based on the current understanding of levee failure mechanisms, properly trimmed and spaced levee vegetation poses a low threat to levee integrity as compared to many indisputable risk factors, such as under-seepage, through-seepage, slope instability, erosion, and rodents.

The adaptive Levee Vegetation Management Strategy encourages and supports continued research on the risks and benefits of trees in relation to levee performance. State and local agency-sponsored research, along with Corps sponsored research, are addressing information gaps surrounding levee performance through applied research and an ongoing synthesis of historical information. Findings of these research programs are informing current policy development, and will continue to do so for future CVFPP updates. Waterside vegetation acts to stabilize the bank and provide erosion protection, while also providing habitat for sensitive species. In order to sustain this critical habitat, the CVFPP levee management strategy retains waterside vegetation. Vegetation would be removed (in coordination with resource agencies) only when it presents an unacceptable threat.

- (3) In addition to the 3:1 replacement of vegetation that is proposed as a result of project construction, NMFS recommends purchasing riparian enhancement credits at a NMFS-approved conservation bank within the project's service area.

IX. Recommendations to the Corps Regarding Feasibility Studies for Future Consultations

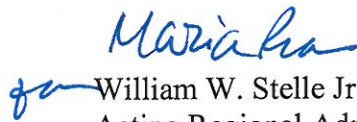
- (1) Future consultations (including Feasibility Studies) should have NMFS participation early in the planning process. This will allow NMFS to assist with identification of avoidance and minimization measures, design of self-mitigating sites where appropriate, and assistance in evaluating potential mitigation options. For example, the American River Common Features General Reevaluation Report is a complex project with significant potential for adverse effects to listed species and their designated critical habitat. Early NMFS participation will assist in reducing these impacts and facilitate a quicker and more streamlined consultation process.
- (2) NMFS has significant concerns regarding strict application of the ETL to future action proposed by the Corps and the potentially significant impacts that this application may have on federally listed anadromous fish and their designated critical habitat. The ESA requires all Federal agencies to ensure that designated critical habitat will not be destroyed or adversely modified and that Federal agencies are required to support and implement programs for the conservation of listed species. As described above under Conservation Recommendation #2, the Corps should consider vegetation management alternatives other than strict adherence to the ETL, such as a variance that includes vegetation management standards adopted by the CVFPP.
- (3) NMFS is concerned that future requests for consultation (including Feasibility Studies) at the 30 percent design, may not meet the information needs to initiate formal consultation as described in CFR 402.14(c). The Corps should work closely with NMFS to ensure that future requests for consultation are specific enough to adequately analyze the effects the full scope of potential effects on Federally listed species and their designated critical habitat.

(4) Final or draft Environmental Impact Statement analysis should not be used in lieu of appropriate analysis needed as part of a BA. To serve as reference for consultation on future Corps Feasibility Studies, the following six pieces of information needed in detail as described in CFR 402.14(c) are required for Section 7 Consultation:

- a. A description of the proposed action to be covered;
- b. A description of the specific area that may be affected by the proposed action;
- c. A description of any listed species or critical habitat that may be affected by the proposed action;
- d. A description of the manner in which the action may affect any listed species or critical habitat, and an analysis of any direct, indirect, or cumulative effects;
 - i. Direct Effects: Effects to listed species of designated critical habitat that occur during implementation of the project;
 - ii. Indirect Effects: Effects to listed species that occur later in time or offsite, but are reasonably certain to occur;
 - iii. Cumulative Effects: For purposes of the ESA, cumulative effects are defined as the effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within an action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions are not included here because they require separate consultation pursuant to Section 7 of the ESA;
- e. Relevant reports, including any environmental impact statements, environmental assessments, biological assessments or other analysis prepared regarding the proposal; and
- f. Any other relevant studies or other information available on the action, the affected listed species, or critical habitat.

If you have any questions or comments regarding this letter, please contact Mike Hendrick at (916) 930-3605 or via e-mail at Michael.Hendrick@noaa.gov.

Sincerely,


 William W. Stelle Jr.
 Acting Regional Administrator

cc: Copy to file ARN: 151422SWR2013SA00183
 NMFS, PRD, Long Beach, CA
 Daniel Welsh, Acting Field Supervisor, US Fish and Wildlife Service, 2800 Cottage Way, Room W-2605, Sacramento, CA, 95825-1846
 Sandra Morey, Deputy Director, California Department of Fish and Wildlife, 1416 Ninth Street, #1208, Sacramento, CA, 95814

Mike Inamine, Executive Director, Sutter Butte Flood Control Agency, 1227 Bridge Street, Suite C, Yuba City, CA 95991

Literature Cited

Beamesderfer, R., M. Simpson, G. Kopp, J. Inman, A. Fuller, and D. Demko. 2004. Historical and current information on green sturgeon occurrence in the Sacramento and San Joaquin rivers and tributaries. Prepared for State Water Contractors by S.P. Cramer and Associates, Inc., Gresham, Oregon. 46 pages.

SWRI. 2003. Literature review of life history and habitat requirements for Feather River fish species. Oroville FERC Relicensing (Project No. 2100) Interim Report SP-F3.2 Task 2/SP-F21 Task 1. January 2003.

Personal Communication

Seesholtz, Alicia. 2008. Environmental Scientist. California Department of Water Resources. Sacramento, CA. September 19, 2008—telephone conversation.



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ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

JUN 25 2013

Environmental Resources Branch

Ms. Jan Knight, Acting Field Supervisor
U.S. Fish and Wildlife Service
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846

Dear Ms. Knight:

This letter is to request reinitiation of formal consultation to address effects of the Sutter Basin Pilot Feasibility Study (SBPFS) on the Federally listed valley elderberry longhorn beetle (*Desmocerus californicus*) (VELB) and giant garter snake (*Thamnophis gigas*) (GGS) pursuant to Section 7(a) of the Endangered Species Act, as amended.

On May 2, 2013, the USFWS issued a Biological Opinion (Reference File: 08ESMF00-2013-F-0342-1) for the Feather River West Levee Improvement Project (FRWLP). Based on coordination between our staffs, it was determined that Section 7 consultation for the SBPFS would be accomplished by reinitiating formal consultation under the Biological Opinion issued for the FRWLP. Construction of the SBPFS is dependent on Congressional authorization and funding appropriation; construction of the SBPFS may be limited to those project reaches that are not constructed under the FRWLP.

The SBPFS' Tentatively Selected Plan (TSP) would have additional effects to the VELB and GGS due to USACE's levee safety vegetation policy, levee design modifications, and operation and maintenance activities. Enclosed is our biological assessment addendum to reinitiate formal consultation and details of the TSP are provided in the Sutter Basin Pilot Feasibility Draft Report – Draft Environmental Impact Report/Supplemental Environmental Impact Statement (CD enclosed).

The biological assessment addendum indicates that the SBPFS TSP is likely to adversely affect VELB due to the removal of 162 elderberry shrubs and the potential for injury or mortality of VELB during removal and transplantation. The TSP is also likely to adversely affect GGS due to temporary loss of 6.18 acres of suitable aquatic habitat and 112.47 acres of upland habitat, the permanent loss of 3.54 acres of upland habitat, and the potential for injury or mortality to the snake during construction and operation and maintenance activities.

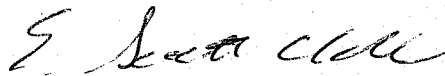
A draft Mitigation and Monitoring Plan has been developed to address effects to listed species, Waters of the U.S., and natural habitats. Effects to VELB would be compensated at the existing 48.5-acre Star Bend Conservation Area, approximately 6 miles south of Yuba City on the west levee of the Feather River. The appropriate compensation for these effects would require at least 20.1 acres of land to accommodate approximately 162 elderberry shrubs, 2,430 elderberry cuttings or seedlings, and 2,430 native plants. The conservation area in which the transplanted elderberry shrubs and seedlings are planted will be protected in perpetuity as habitat


for VELB. The TRLIA Feather River Floodway Corridor Restoration Project is proposed as a second mitigation site for riparian habitat compensation. The proposed site is located on the east bank of the Feather River just upstream of the Star Bend site.

The Corps proposes to compensate for permanent impacts of the 3.54 acres of upland snake habitat by purchasing credits at a USFWS approved mitigation bank, as described in the BA. Temporarily affected aquatic and upland habitat would be restored to pre-project conditions within a maximum of one season. The proposed action includes other conservation measures to avoid and/or minimize any effects on the VELB and GGS.

Based on the information in this letter and enclosure, please provide an amended BO based on the additional effects of the SBPFS on the Federally listed VELB and GGS. If you have any questions or need additional information, please contact Mr. Brad Johnson, Environmental Manager, at (916) 557-7812 or email: Bradley.C.Johnson@usace.army.mil. Thank you for your attention to this matter.

Sincerely,



 Alicia E. Kirchner
Chief, Planning Division

Enclosures

Copy furnished (w/encl):

Mr. Doug Weinrich, U.S. Fish and Wildlife Service, 2800 Cottage Way, Sacramento, CA 95825
Ms. Jennifer Hobbs, U.S. Fish and Wildlife Service, 2800 Cottage Way, Sacramento, CA 95825



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846



In Reply Refer To:
08ESMF00-2013-F-0342-R001

SEP 19 2013

Ms. Alicia Kirchner
Chief, Planning Division
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95814

Subject: Formal Consultation on the Feather River West Levee Project, Sutter County, California

Dear Ms. Kirchner:

This is in response to your June 25, 2013, request to reinitiate formal consultation with the U.S. Fish and Wildlife Service (Service) on the Feather River West Levee Project in Sutter and Butte Counties, California. Your request was received in our office on June 27, 2013. The original biological opinion (81420-2013-F-0342-1) was completed on May 2, 2013. The original consultation was conducted with the Corps and the Sutter Butte Flood Control Agency (SBFCA). SBFCA's proposed project is currently being constructed in advance of the federally led Sutter Basin Pilot Feasibility Study (SBPFS). The Corps is reinitiating consultation due to changes in the project description that modifies the project such that it meets Corps regulations. The changes enlarge the footprint of the project. This enlarged footprint would affect the federally-threatened giant garter snake (*Thamnophis gigas*) and valley elderberry longhorn beetle (*Desmocerus californicus*). These effects have not been previously analyzed. This response is in accordance with 50 CFR 402.16 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The May 2, 2013, biological opinion's project description was for the SBFCA Feather River West Levee Project (FRWLP), which was planned in advance of the Corps' SBPFS planning. The majority of the footprint for the two projects is the same. The Corps' SBPFS has a slightly larger footprint and a few new activities, which changes the effects of the project on listed species. Because SBFCA wanted to construct as soon as possible, they initiated section 7 consultation through the Corps as part of their 408 approvals. SBFCA is currently constructing a portion of the project in 2013. The SBPFS is part of the Corps' Civil Works program and the Corps is reinitiating consultation to include the additional footprint and activities. The project description in this biological opinion is inclusive of the SBFCA project and includes the additional SBPFS activities.

The Service is amending the project description and effects analysis within this biological opinion. Paragraphs that contain changes from the May 2, 2013, document have been bolded. This biological opinion supersedes the May 2, 2013, biological opinion.

CONSULTATION HISTORY

July 13, 2012. The Service, ICF International, HDR Inc., consultants to Sutter Butte Flood Control Agency (SBFCA), California Department of Fish and Wildlife (CDFW), California Department of Water Resources, and the Corps participated in a site visit to the proposed project. Potential effects to giant garter snake were discussed on the trip.

September 27, 2012. The Service, Corps, HDR, and ICF met to discuss the biological opinion and the level of detail that will be available in order to initiate consultation. The applicant determined that they will have sufficient information to initiate consultation at the project level.

December 18, 2012. The Service, Corps, SBFCA, ICF, and HDR met to discuss effects to giant garter snake. Permanent and temporary effects were discussed as well as the Service providing suggestions on conservation measures that could be incorporated.

February 12, 2013. The Service, Corps, ICF, CDFW, and HDR met to discuss long-term operations and maintenance (O&M). The outcome of this meeting was that the SBFCA FRWLP will not include operations and maintenance in their project description because their project will not be changing O&M. However, the Corps will be initiating consultation on the Sutter Feasibility Study in the next 6 months and this project description will include O&M activities.

March 22, 2013. The Corps initiated section 7 consultation with the Sacramento Fish and Wildlife Office.

June 25, 2013. The Corps reinitiated consultation due to an expansion of the project description as part of the Corps' SBPFS. The addendum to the O&M manual has not been written yet and therefore is not fully part of the project description. The Corps will re-initiate consultation with the Service when the addendum has been written.

BIOLOGICAL OPINION

Description of Action Area

North to south, the Action Area consists of the 41-mile corridor along the west levee of the Feather River from the Thermalito Afterbay to a point about 4 miles north of the Sutter Bypass. The Action Area includes the project construction area and a 100-foot buffer around this area which includes staging and spoils areas. The project construction area was defined as the area in which levee improvements—such as seepage berms, stability berms, relief wells, sheet-pile walls, and slurry cutoff walls—are likely to be constructed. All direct and indirect effects will occur within this area and the 100-foot buffer around this area.

The corridor is divided into 41 relatively homogeneous reaches for ease of describing existing conditions, project components, land cover-types, and potential effects (note that this number is coincidental and one reach does not correspond to a length of 1 mile; additionally, Reach 1 is not part of the FRWLP) (Figure 1).

The Action Area also includes six potential borrow sites that could supply the borrow material necessary for levee construction and upgrades, and routes from the project construction area to the borrow sites. It is not anticipated that all six sites will be used over the multi-year phased construction period, but until additional geotechnical and soil samplings are completed, all sites will be available for use and are included in the Action Area.

Finally, the Action Area includes the existing 48.5-acre Star Bend Conservation Area, located on the west levee of the Feather River, about 6 miles south of Yuba City. Compensation for the Proposed Action's effects on the beetle is proposed to occur in a portion of this conservation area, which is discussed below under Conservation Measure 5.

Description of Proposed Action

The primary purpose of the **FRWLP/SBPFS (Proposed Project)** is to reduce flood risk in the Sutter Basin by addressing known levee deficiencies along the Feather River West Levee from Thermalito Afterbay downstream to a point about 4 miles upstream of the Feather River's confluence with the Sutter Bypass. While the **Proposed Project** will not by itself reduce all flood risks affecting the Sutter Basin, it will address the most immediate risks based on the following.

- The proximity of the Feather River to population centers and key infrastructure.
- The nature of the Feather River West Levee being the longest and most contiguous portion of the planning area perimeter.
- The location of known levee deficiencies and the clarity and feasibility of available measures to address them.

The construction of the **Proposed Project** will be divided into four separate reaches. **Reach A** begins near the intersection of the Feather River West Levee and Laurel Road. It continues north to the beginning of the improvements constructed as part of the Star Bend Setback Levee Project. The total length of the levee in this portion of the **Proposed Project** is 27,618 linear feet. **Reach B** begins at the end of the improvements constructed as part of the Star Bend Setback Levee Project, and continues north for 31,963 linear feet. **Reach C** begins near the north end of the Shanghai Bend Setback Levee, and continues north for a total of 77,886 linear feet. **Reach D** then begins and continues north for 69,363 linear feet.

For **Reach A**, a cutoff wall ranging between 10 and 35 feet deep will be constructed along the centerline of the levee for the entire length of levee. The overall height of the levee will be degraded by about 50%. In addition to the cutoff wall, a portion of the levee will have a 12,066-foot-long; 100-foot-wide seepage berm installed.

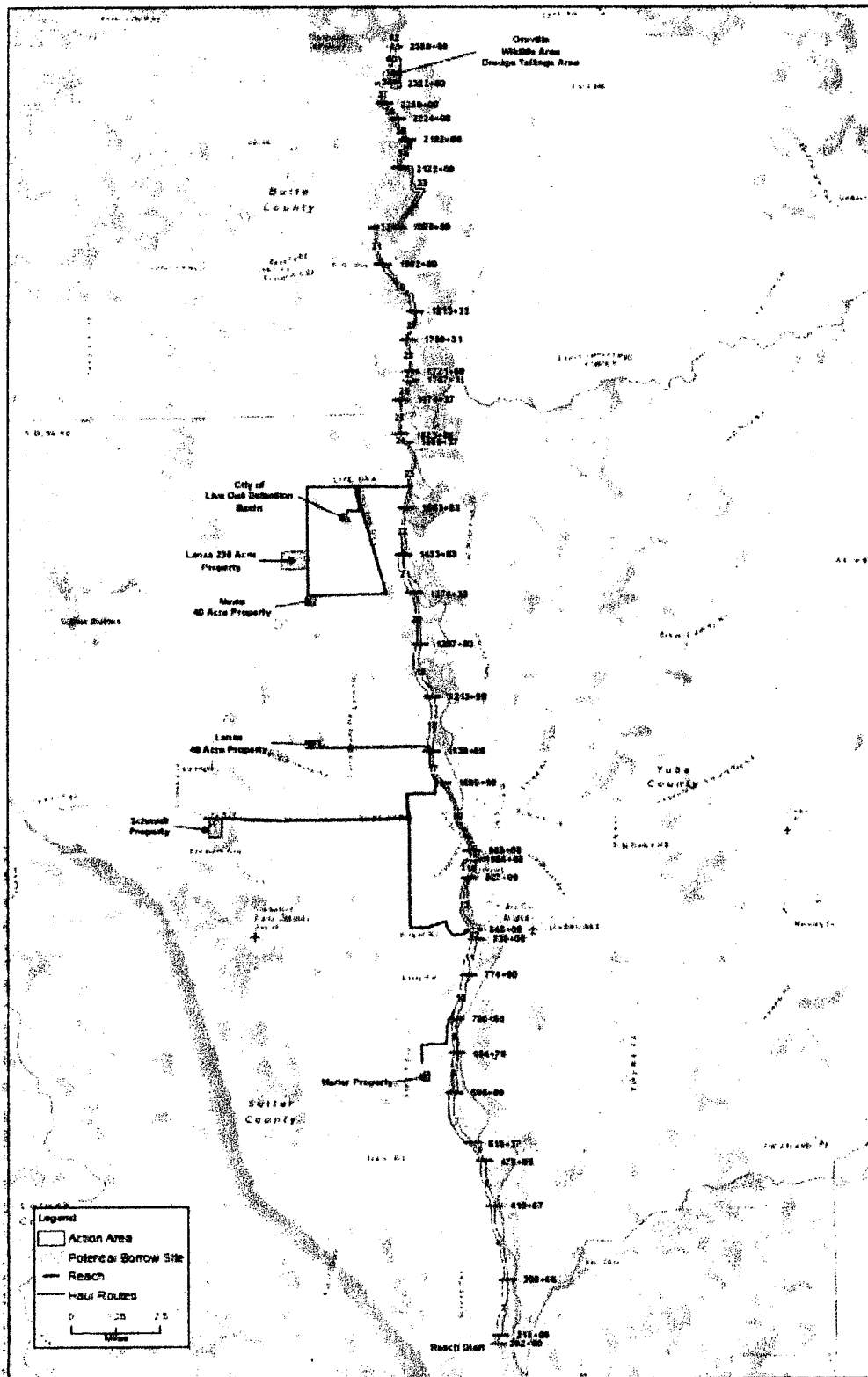


Figure 1. Proposed Project

For **Reach B**, a cutoff wall ranging between 5 and 25 feet deep will be constructed along the centerline of the levee for 31,600 linear feet. The overall height of the levee will be degraded by about 50%. Relief wells 60 feet apart and 50 feet deep will be installed along a 2,500 linear foot section. **To address erosion caused by potential levee overtopping 5,760 linear feet of landside levee will have erosion protection matting installed.** Finally, two small sections will involve pipe crossing work.

For **Reach C**, a cutoff wall ranging between 5 and 65 feet deep will be constructed along the centerline of the levee for 62,117 linear feet. The overall height of the levee will be degraded by about 50%, with about 5,900 linear feet of the levee needing to be fully degraded. A 7-foot tall and 50-foot-wide seepage berm will be placed near the 10th Street bridge and extend through the existing abandoned railroad tunnel. **To address erosion caused by potential levee overtopping 1,900 linear feet of landside levee will have erosion protection matting installed. In two locations along this reach the Sutter Butte Canal is adjacent to the levee. For 483 linear feet the Corps will move the canal away from the levee and for 3,100 linear feet the Corps will move the levee away from the canal.** Finally, there will be a few storm drain pipes replaced within the levee.

For **Reach D**, a cutoff wall ranging between 10 and 90 feet deep will be constructed along the centerline of the levee for 57,361 linear feet. For all but 317 linear feet of levee, the levee will be degraded by about 50%. The remaining 317 linear feet will have a full levee degrade and reconstruction. **The Sutter Butte Canal is adjacent to the landside of the levee. For 7,900 linear feet the levee will be relocated away from the canal and for 1,200 linear feet the canal will be relocated away from the levee.** Six storm drain and irrigation pipes will need to be replaced along a section of the levee. About 4,800 linear feet of seepage berm will be constructed at the northern end of the proposed project. The berm will vary in width between 100 and 170 feet. Additionally, a waterside pit located in this area will be filled.

Materials imported to the construction site will include water, bentonite, cement, incidental construction support materials, aggregate base rock, hydroseed, and up to 1,500,000 cubic yards of embankment fill material for the new levee surfaces from offsite commercial borrow sites or local landowners willing to sell borrow material. For backfill of new pipelines crossing the levee, controlled low strength material (CLSM) (otherwise known as lightweight concrete) will be placed to the pipeline's spring line.

Construction methods for the flood management measures are described in detail below.

Slurry Cutoff Wall

A slurry cutoff wall consists of impermeable material that is placed parallel to the levee, typically through the center of the levee crown. There are three methods for constructing a slurry cutoff wall: (1) conventional slot trench, (2) deep soil mixing (DSM), and (3) jet grouting. The first two are the primary methods for application over longer areas, while jet grouting is a spot application based on limiting conditions. A slurry cutoff wall addresses the deficiency of seepage (through- and under-seepage).

Conventional Slot Trench Method - To begin construction, the construction site and any necessary construction staging or slurry mixing areas are cleared, grubbed, and stripped. In the conventional slot trench method, a trench is excavated at the top center of the levee and into subsurface materials. The size of the trench is based on the severity of the seepage but can be typically 3 feet wide and up to 80–90 feet deep. As the trench is excavated, it is filled temporarily with bentonite water slurry to prevent cave-in. The soil from the excavated trench is hauled to a nearby location where it is mixed with hydrated bentonite to reduce permeability and cement in some applications where increased strength is desired. The soil-bentonite mixture then is returned to the levee and backfilled into the trench. This mixture hardens and creates the impermeable barrier wall in the levee.

In most cases, degradation of the levee crown is necessary to create a large enough working platform to reduce the risk of hydraulic fracturing from the insertion of slurry fluids, and allowing greater depths to be reached. Dependent on the conditions of the particular levee, it may be necessary to degrade the levee by one- to two-thirds its existing height. The material from degrading the levee is hauled to a nearby stockpile area. Following completion of the slurry cutoff wall, the material is hauled back to the levee to restore the levee to its original dimensions. The material may need to be hauled offsite to a local landfill, and borrow material may need to be imported if the in-situ levee material is found to be unsuitable for current levee standards.

One construction crew typically is able to construct 75-100 linear feet of slurry wall (about 70-80 feet deep) in an 8-hour shift. Equipment needed for the crew includes a long-reach track hoe, three or four dump trucks (15 cubic yard capacity each), two loaders at the mixing location, bulldozers, excavators, loaders, a rough terrain forklift, compactors, maintainers, and a water truck. Vertical clearance of about 40 feet is needed for the excavator boom. Horizontal clearance of about 30 feet beyond the levee crest may be required for excavator swing when loading dump trucks.

A mixing area is located at the construction staging area. The mixing area is to prepare the soil-bentonite mixture and supply bentonite-water slurry. The mixing area is contained to avoid inadvertent dispersal of the mixing materials. Dump trucks haul material between the excavator and the mixing area along the levee.

An access road made of aggregate base rock is constructed on the levee crown to enable regular levee inspections. Post-construction, areas used for construction staging, mixing, the levee crown, slopes, and any other disturbed areas are hydroseeded.

Deep Soil Mixing (DSM) Method - The DSM method of constructing a slurry cutoff wall uses a crane-supported set of two to four mixing augers (typically 36 inches in diameter) set side by side. These augers are drilled through the levee crown and foundation to the required depth (capable of a maximum depth of about 200 feet). As the augers are inserted and withdrawn, a soil-bentonite grout is injected through the augers and mixed with the native soil. An overlapping series of mixed columns is drilled to create a continuous seepage cutoff barrier.

To provide a wide enough working platform on the levee crown, the upper portion of some segments of the levee requires excavation with a paddle wheel scraper. Material is scraped and

stockpiled at a nearby stockpile area. Dependent on the depth of the wall required, vertical clearance for the crane also may be needed. An excavator manipulates injector return spoils near the DSM rig, and transport trucks are used to haul spoils offsite. A crane is used for in-place sampling of DSM material and also for loading bentonite into the batch plant hopper. A mobile batch plant (diesel-powered) is required near each DSM rig at the work area to prepare the cement-bentonite grout. The grout is transported to the DSM rig through flexible hoses. Each batch plant requires a pad of 50 by 100 feet. Hauling at the work area involves scraper runs along the levee to the staging area and cement and bentonite deliveries to the batch plant.

During DSM slurry wall construction, one DSM rig typically can construct 50 linear feet of DSM wall per 8-hour shift (for wall depths up to 135 feet). Post-construction, areas used for construction staging, the levee slopes, and any other disturbed areas are hydroseeded.

Jet Grouting Method - Jet grouting involves injecting fluids or binders into the soil at very high pressure. The injected fluid can be grout; grout and air; or grout, air, and water. Jet grouting breaks up soil and, with the aid of a binder, forms a homogenous mass that solidifies over time to create a mass of low permeability. Jet grouting typically is used in constructing a slurry cutoff wall to access areas other methods cannot. In this regard, it is typically a spot application rather than a treatment to be applied on a large scale along an entire reach.

Equipment required for jet grouting consists of a drill rig fitted with a special drill string; a high pressure, high flow pump; and an efficient batching plant with sufficient capacity for the required amount of grout and water. The high-pressure pump conveys the grout, air, and/or water through the drill string to a set of nozzles located just above the drill bit. The diameter of the jet grout column is dependent on site-specific variables such as soil conditions, grout mix, nozzle diameter, rotation speed, withdrawal rate, and grout pressure. Jet grouted columns range from 1 to 16 feet in diameter and are typically interconnected to form cutoff barriers or structural sections. Under ideal conditions, one construction crew—consisting of a site supervisor, pump operator, batch plant operator, chuck tender, and driller—can construct two 6-foot diameter, 50-foot columns per day consisting of about 100 cubic yards of grout injected per 8-hour shift. Ideal conditions will be characterized by no technical issues occurring at either the batch plant or the drilling site, such as loss of fluid pressure, breakdown of equipment, or subsurface obstructions to drilling operations.

To initiate jet grouting, a borehole is drilled through the levee crown and foundation to the required depth (to a maximum depth of about 130 feet) by rotary or rotary-percussive methods using water, compressed air, bentonite, or a binder as the flushing medium. When the required depth is reached, the grout is injected at a very high pressure as the drill string is rotated and slowly withdrawn. Use of the double, triple, and superjet systems create eroded spoil materials that are expelled out of the top of the borehole, this material is frequently used as a construction fill.

To provide a wide enough working platform on the levee crown, the upper portion of some segments of the levee may require degradation with a paddle wheel scraper. Material is scraped and stockpiled at a nearby stockpile area. Hauling at the work area involves scraper runs along the levee to the staging area and grout, bentonite, and water deliveries to the batch plant.

Batch plants are typically centrally located to the injection site, with pipelines for mixed grout that run the length of the work. Grout mixing and injection equipment consists of grout mixers, high powered grout pumps and supporting generators and air compressors, holding tanks, and water tanks, with bulk silos of grout typically used to feed large mixers. Smaller equipment can be used in combination with the single phase-fluid system and can be permanently trailer-mounted to permit efficient mobilization and easy movement at the job site.

Prior to commencing production jet grouting, a field test program is typically completed to evaluate injection parameters and to assess jet grout column geometries, and mechanical and permeability properties. Where possible, jet grout test elements are exposed by excavation and properties are obtained by direct measurement. Where excavation is not possible, core drilling is employed to obtain samples from the jet grout test columns for strength testing. Areas used for construction staging, the levee slope, and any other disturbed areas are restored and hydroseeded following construction.

Slope Flattening

Slope flattening is a mechanical method to repair or reshape slopes that do not meet standards for geometry and stability. Levee slopes are typically subject to a standard of 3:1 (horizontal to vertical), but this may vary based on site-specific conditions and supporting engineering analysis. Slope flattening addresses the deficiency of slope stability and geometry. To begin slope flattening activities, the area is cleared, grubbed, and stripped to provide space for construction and reshaping of slopes. Additional embankment fill material may be necessary to achieve slope flattening—if so, bulldozers excavate and stockpile borrow material from a nearby permitted borrow site. Front-end loaders load haul trucks with the borrow material. The haul trucks transport the material to slope flattening site. Motor graders spread material evenly according to levee design plans, and sheepfoot rollers compact the material. Water trucks distribute water over the material to ensure proper moisture for compaction.

To reshape a waterside slope, the existing crown of the levee is shifted farther landward and the waterside slope is trimmed and reshaped to a 3:1 slope. The shifted levee crown will be a minimum of 20 feet wide, with a 3:1 slope on the landward side. An access road made of aggregate base rock is constructed on the levee crown. Post-construction, the construction staging areas, levee slopes, and any other disturbed areas will be hydroseeded.

Stability Berm

A stability berm will be constructed against the landside slope of the existing levee with the purpose of supplying support as a buttress. The height of the stability berm is generally two-thirds the height of the levee; the structural needs of the levee determine the distance it extends along that reach. A stability berm addresses the deficiency of stability. To begin the construction of a stability berm, the site is cleared, grubbed, and stripped to provide space for construction and shaping of the berm. Embankment fill material necessary to construct the berm is excavated by a bulldozer from a nearby borrow site. Front-end loaders load haul trucks with the borrow material, and the haul trucks transport the material to the stability berm site. Motor graders spread the material evenly according to design specifications, and a sheepfoot roller

compacts the material. Water trucks distribute water over the material to ensure proper moisture for compaction.

Stability berms may be drained or undrained. An undrained berm consists of embankment fill only. A drained berm includes a layer of drain rock placed along the ground surface underneath the fill material, separated by a casing of filter fabric. Drainage water seeping from the berm will sheetflow on the adjacent landside surface.

Levee Reconstruction

Levee reconstruction will be necessary where a levee has been degraded to facilitate implementation of another measure (such as a slurry cutoff wall), where a substantial encroachment has been removed from within the levee prism, or otherwise where the levee is found to be deficient and needs to be replaced with materials and methods that meet current engineering standards. The existing levee is first cleared, grubbed, and stripped to the desired surface to allow a working platform for other measures (such as a slurry cutoff wall), to remove an encroachment, or to remove substandard material. Embankment fill material necessary to construct the new levee is excavated by a bulldozer from a nearby borrow site. Front-end loaders load haul trucks with the borrow material and the haul trucks transport the material to the stability berm site. Motor graders spread the material evenly according to design specifications, and a sheepsfoot roller compacts the material. Water trucks distribute water over the material to ensure proper moisture for compaction. The new levee will be built in cross section to meet current engineering standards.

Sheet-Pile Wall

A sheet-pile wall is a series of vertical panels of interlocking steel that is placed parallel to the levee, typically through the center of the levee crown to provide an impermeable barrier. A sheet-pile wall addresses the deficiencies of seepage and will be used only as a site-specific treatment (rather than applied on a reach-wide basis) such as at roadway or railroad crossings. The site where sheet piles are to be installed is cleared, grubbed, and stripped to allow for construction activities, including removal of the roadway or railroad. A hydraulic- or pneumatically-operated pile-driving head attached to a crane drives the sheet pile into the levee crown to the desired depth (up to 135 feet). If the levee material is particularly solid, pre-drilling may be necessary. The conditions of the site and the desired life of the project determine the thickness and configuration of the sheet piles.

Post-construction, construction staging areas, the levee crown, slopes, and any other disturbed areas are hydroseeded and the roadway or railroad will be replaced in-kind to the pre-project condition.

Seepage Berm

Seepage berms are wide embankment structures made up of low-permeability materials that resist accumulated water pressure and safely release seeping water. A seepage berm is typically one-third the height of the levee, extending outward from the landside levee toe for 300–400 feet, and laterally along the levee as needed relative to the seepage conditions. A seepage berm

addresses the deficiency of under-seepage. A seepage berm can vary in width, from a minimum of four times the levee height to a maximum of 300 feet. Berm heights can also vary but are typically a minimum of 5 feet tall at the landside toe of the levee and generally taper down to 3 feet at the end of the berm.

Construction consists of clearing, grubbing, and stripping the ground surface. Bulldozers then excavate and stockpile borrow material from a nearby borrow site. Front-end loaders load haul trucks, and the haul trucks subsequently transport the borrow material to the berm site. The haul trucks dump the material and motor graders spread it evenly, placing 3–5 feet of embankment fill material. Sheepsfoot rollers compact the material, and water trucks distribute water over the material to ensure proper moisture for compaction.

Seepage berms may have an optional feature of a drainage relief trench under the toe of the berm. Drained seepage berms include the installation of a drainage layer (gravel or clean sand) beneath the seepage berm backfill and above the native material at the levee landside toe. A drained seepage berm does not increase the overall footprint of the berm. Post-construction, areas used for construction staging, the levee, the berm, and any other disturbed areas are hydroseeded.

Relief Wells

Relief wells are passive systems that are constructed near the levee landside toe to provide a low-resistance pathway for under-seepage to exit to the ground surface in a controlled and observable manner. A low-resistance pathway allows under-seepage to exit without creating sand boils or piping levee foundation materials. Relief wells are an option only in reaches where geotechnical analyses have identified continuous sand and gravel layers. Relief wells are constructed using soil-boring equipment to drill a hole vertically through the fine-grained blanket layer (sand) into the coarse-grained aquifer layer (gravel) beneath. Pipe casings and gravel/sand filters are installed to allow water to flow freely to the ground surface, relieving the pressure beneath the clay blanket without transporting fine materials to the surface, which can undermine the levee foundation. Relief wells will be designed to discharge onto a cobble splash, and the water will then sheet flow into adjacent agricultural fields. In areas where sheet flow is not feasible, a swale will be excavated and connected to a drainage canal.

Relief wells generally are spaced at 50- to 100-foot intervals, dependent upon the amount of under-seepage, and extend to depths of 150 feet. Areas for relief well construction are cleared, grubbed, and stripped. During relief well construction, a typical well-drilling rig is used to drill to the required depth and construct the well (including well casing, gravel pack material, and well seal) beneath the ground surface. The drill rig likely will be an all-terrain, track-mounted rig that could access the well locations from the levee toe.

Piezometers, also called monitoring wells, could be installed between relief wells to allow monitoring of groundwater levels to ensure the wells are relieving the pressure within the aquifer.

Areas along the levee toe may be used to store equipment and supplies during construction of each well. Construction of each well and the lateral drainage system typically takes 10–20 days.

Additional time may be required for site restoration. Post-construction, areas used for construction staging, the levee slopes, and any other disturbed areas are hydroseeded.

Depression/Ditch Infilling

Landside depressions and ditches can contribute to risk of levee failure if a seepage pathway forms under the levee and the water then surfaces through the depression or ditch, exploiting its less resistive nature compared to surrounding soil mass. This measure involves placing fill soil in such depressions and ditches to remove localized susceptibility to seepage. Construction consists of clearing, grubbing, and stripping the ditch or depression surface to remove vegetative material. Bulldozers then excavate and stockpile borrow material from a nearby borrow site. Front-end loaders load haul trucks, and the haul trucks subsequently transport the borrow material to the fill site. The depression or ditch may be further excavated to provide a surface that the fill soil may be keyed into. The haul trucks dump the material and motor graders or bulldozers smooth the material level with the surrounding land surface. An excavator may also be used for placement. Sheepsfoot rollers compact the material, and water trucks distribute water over the material to ensure proper moisture for compaction.

Erosion Protection Matting

Erosion protection matting will be installed at two locations on the landside of the levee to provide protection in case of a levee overtopping event. The matting will be installed on the landside of the levee. The surface will be degraded 4 to 6 inches and the topsoil will be reserved, the matting will then be placed and anchored with steel cables and pins placed 6 feet on center to a depth of 1 foot. The edges of the matting will be buried 18 to 24 inches deep to prevent the edges from coming loose. The surface will then be hydroseeded, covered with the 2 inches of topsoil, and then hydroseeded again.

Sutter Butte Canal Seepage Remediation

The Sutter Butte Canal is adjacent to the levee at three locations in two separate reaches. This can cause seepage and stability issues as the bank of the canal is also the landside levee slope. This will be addressed through the slurry wall, but it does not allow for a maintenance easement at the landside toe of the levee. The Corps needs a 15-foot easement off the levee toe, which includes a maintenance road and access for flood fighting. In order to provide the required easement the Corps will either move the levee waterward or the canal landward to provide the space for the operation and maintenance easement. For the canal relocation, construction of the new canal would occur prior to filling of the existing canal. Once construction of the new canal is complete, it will be connected to the existing system through the removal of soil to place the new canal into service. The old canal will be dewatered and remain dry for 15 days prior to filling it. For levee relocation half of the existing levee would be degraded to create the new access road on the landside of the levee. The remaining levee would be degraded and a slurry wall would be placed at the center of the new levee location. The levee will then be rebuilt in its new location.

Removal and Relocation of Pacific Gas & Electric Facilities

Prior to and/or concurrent with levee rehabilitation construction, Pacific Gas and Electric Company (PG&E) will need to remove and relocate facilities located within the footprint of the **Proposed Project**. PG&E's utility relocations will need to occur in advance of SBFCA's **and the Corps'** construction activities at any given location. Construction sequencing for SBFCA's and **the Corps'** work will be dynamic throughout project planning and design. PG&E's construction schedule will be determined by further engineering to clarify and determine efficacy of site-specific measures; the availability of funding for the **Proposed Project**; easement and right-of-way acquisition; availability of borrow material for the levee improvement activities; and/or environmental clearances based on wildlife presence, lifecycle activity, and location of habitats. PG&E's construction schedule will be further influenced by utility operation and maintenance constraints, particularly for relocation activities that require taking existing facilities temporarily out of service. As necessary, geotechnical mitigation measures will be incorporated into construction design to ensure that utility facilities effectively co-exist with the **Proposed Project**; relocation will be done where this is not feasible.

For PG&E's electrical transmission and distribution activities, PG&E will install and remove new electrical transmission and distribution poles. Electrical transmission and distribution pole removal is conducted by a line crew, who typically access each pole site with a line truck and trailer or a boom truck, except in those instances when the pole is located on the levee crown (a crane may be used in those instances). On average, removal of vegetation up to 50 feet from the toe of the levee will need to occur to accommodate pole installation activities; this distance may be greater in instances where the installation activity is located further than 30 feet from the levee toe. After vegetation is cleared, PG&E will remove and replace the existing wood distribution and power poles and related equipment.

For PG&E's natural gas transmission and distribution activities, PG&E will install gas transmission and distribution steel pipe. This also typically includes the removal and disposal of existing pipe. Other typical types of gas transmission and distribution equipment that may be installed include Electric Test System/ Gas Cathodic Test System meter stations for future pipe monitoring purposes, and pipeline markers at angle points and at levee crossing locations. Clearing and grading operations in support of installation of natural gas facilities typically involve preparation of the right-of-way, including vegetation removal, debris disposal, and land leveling. Installation sites are backfilled using sand to create a 6-inch insulation zone around the pipe and then covered by native soil from the project area. In some instances, a crane may be required to place pipe at crossing sites located at the crowns of the levees. Dump trucks will be used to transport sand and soil materials. Spoil piles may be temporarily placed onsite while the installation activities are occurring.

Hydrostatic testing associated with installation of natural gas facilities will be performed to test the strength of the new pipeline. Test water intake and discharge will be performed in accordance with all regulations and permit requirements.

Typical electrical and natural gas transmission and distribution project work schedules are comprised of an average 9-hour day, at an average of 6 days per week per crew. Typical crews consist of 3 to 5 members.

PG&E work areas will be about 125 feet by 125 feet in diameter and located in close proximity to installation activity locations. On average, PG&E will require up to 10 work areas per **reach** phase. PG&E will utilize the work areas identified by SBFCA **and the Corps** whenever possible. Typically, PG&E project access is achieved through existing public and private roads. Removal of vegetation to utilize access roads by PG&E equipment and transport of facilities may be required. PG&E currently owns easements along the entire project corridor. However, temporary and/or permanent easements as required for construction and maintenance of these facilities are being acquired by SBFCA **and the Corps**.

Encroachment and Vegetation Removal

Encroachments - Existing facilities found within the footprint of an alternative may require removal and replacement nearby, abandonment, or relocation. Encroachments are numerous (over 400 identified) along the Feather River West Levee and may need to be addressed if they present a threat to the stability of the levee, do not currently comply with the levee encroachment criteria, or will be disrupted or otherwise impacted by construction activities. Typical encroachments include pressure pipelines (water supply pipelines from waterside pump stations and drainage pipelines from landside drainage pump stations), gravity drainage pipes, gas lines, telephone utilities, overhead utilities, structural encroachments, and other types and variations. Debris from structure and embankment fill material of poor quality will be hauled offsite to a permitted disposal site within 20 miles of the removal location.

Vegetation Removal - Vegetation removal will involve stripping of herbaceous (non-woody) vegetation by bulldozer. **The Corps will construct this project consistent with their Engineer Technical Letter 1110-2-571, *Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures* (ETL).** The ETL requires that a “vegetation free zone” be maintained along all levees in order to provide access for surveillance, inspection, maintenance, monitoring, and flood-fighting. Any vegetation removed as part of direct construction activities will not be replaced at that location, but will involve offsite, in-kind mitigation.

In accordance with the State of California's Urban Levee Design Criteria, at a minimum, all roots larger than 1.5 inches in diameter that are within 3 feet of the perimeter of the tree trunk will be removed. Immature trees less than 4 inches in diameter at breast height that will be removed may be cut off at or below ground level, generally without root removal. Any excavation will be backfilled with engineered fill using appropriate placement, moisture conditioning, and compaction methods. Additional measures for removing non-compliant vegetation are listed below.

- Ensure that the resulting void is free of organic debris.
- Cut poles to salvage propagation materials for replanting, such as willows and cottonwoods.
- Conduct hand clearing using chainsaws and trimmers.

- Conduct mass clearing using bulldozers.

Debris from vegetation removal will be hauled offsite to a permitted disposal site within 20 miles of the removal location.

Construction Staging, Access, and Temporary Facilities

Staging areas will only be provided within the Action Area. Staging areas will be used for staging construction activities and to provide space to house construction equipment and materials, offices, employee parking, and other uses needed for construction of the proposed project.

To facilitate construction, temporary earthen ramps will be constructed for equipment access between the levee crown and the staging area(s). The earthen ramps will be removed when construction is complete.

Cutoff wall construction requires temporary establishment of an onsite slurry batch plant that will occupy about 1–2 acres. Batch plants will be located at about 1-mile intervals along the levee. The batch plant site will likely contain tanks for water storage, bulk bag supplies of bentonite, bentonite storage silos, a cyclone mixer, pumps, and two generators that meet air quality requirements. Slurry ingredients will be mixed with water and the mixture will be pumped from tanks through pipes to the construction work sites. The batch plant will produce two different slurry mixes, one for trench stabilization and one for the soil backfill mix. Therefore, two slurry pipes or hoses, typically 4- or 6-inch high-density polyethylene pipes, will be laid on the ground and will extend to all work sites. An additional pipe may be used to supply water to the work sites.

Staging, access, and other temporary construction areas will be located away from wetlands, woody vegetated areas, wildlife species habitat, known cultural resources, or other sensitive areas and will be limited to disturbed or ruderal grasslands subject to review by the Corps and resource agencies.

Material Importation, Reuse, and Borrow

Materials imported to the **Proposed Project** construction area will include water, bentonite, cement, incidental construction support materials, aggregate base rock, asphalt, concrete, hydroseed, and embankment fill soil. Large quantities of fill soil, or borrow will be required. To meet borrow demands, embankment fill material excavated as part of construction will be evaluated for reuse. Embankment fill material deemed suitable will be used as part of levee reconstruction and berms. The total volume of material required is 1,500,000 cubic yards.

SBFCA has explored the option of purchasing fill or borrow material from a local commercial quarry or other permitted source; however, there are not currently any sites near the Action Area that could supply the volume and type of material required. Consequently, SBFCA and the Corps plans to purchase fill from local landowners willing to sell borrow material.

Six borrow sites have been identified in the Action Area. Each site was investigated to determine the quantity of available material, hauling distance, material composition, groundwater elevation, and prospects for acquisition. Sufficient fill volume is estimated to be present within an approximate 10-mile, one-way haul distance from the area of construction.

SBFCA and the Corps will maximize the potential borrow sites' use through gradation, placement, and treatment so that they could continue to be used for their current use or otherwise returned to their pre-project condition. As part of borrow operations, the upper 4–6 inches of topsoil will be set aside and replaced after construction in each construction season. After the **Proposed Project** is completed, the borrow site will be re-contoured and reclaimed.

Through outreach efforts, SBFCA identified a number of sites owned by individuals or government agencies willing to sell their property or provide material on a cubic yard basis. Each borrow site is described below.

North Valley Property - The North Valley property is owned by North Valley Properties, LLC and is located south of Ella Road between Feather River Boulevard and Arboga Road. The Wheeler Ranch housing development is proposed at the site. Borrow for the **Proposed Project** will be taken from the northeast corner of the property to create a 24.5 acre detention pond (referred to as the Drainage Basin C Regional Detention Pond, but commonly referred to as the South Ella Detention Pond). The Ella Basin is being constructed as part of Reclamation District No. 784's Master Drainage Plan. Historically, the site was cultivated for agricultural purposes. Currently, the site is disked ruderal grassland with some roads cut in the southern portion of the property for the Wheeler Ranch development. The depth of excavation is anticipated to be 15–20 feet and the yield of material from this site could be 400,000–500,000 cubic yards. Borrow material from this site will be used for work in **Reaches B and C**. If borrow material is remaining, it may also be used for **Reach D**. The haul route to **Reach C** will use existing roads. The post-project land use of the site will be a regional detention pond for Reclamation District No. 784.

Marler Property - The Marler property is a 10-acre property at Johnson Road near Messick Road, north of Star Bend and south of Shanghai Bend. The site is currently an orchard. The depth of excavation could be upwards of 6 feet. The yield of material from this site could be 75,000 cubic yards. The haul route will use existing roads. The post-project land use for the property will be agricultural production, likely row crops or orchard.

Lanza Property - The Lanza property is 40 acres in size and is currently farmed in field/row crops. It is located at North Township Road and Pease Road south of Live Oak and north of Yuba City. The site has not yet been investigated to determine the types of materials present. Excavation of the site to a depth of 6 feet may occur. The yield of material from this site could be 200,000 cubic yards. The likely haul route will be along Pease Road directly east to the levee. The post-project land use for the property will be rice production.

City of Live Oak Detention Basin - Live Oak owns the property formerly known as the Caltrans Detention Basin Site located west of SR 99 and south of Paseo Avenue. The site is currently fallow. Live Oak intends to construct soccer fields and a stormwater detention basin at the site in 2013 or later. Although the site will require hauling for a short distance through a residential

neighborhood, it is anticipated the residents will be amenable to the hauling as it will be a part of the public amenity constructed by Live Oak. This site is about 25 acres, and the depth of excavation is anticipated to be 3–6 feet. The yield of material from this site could be 125,000 cubic yards, and will likely be used for **Reach C**. Haul routes will use existing roads.

Live Oak (2012) reports that land at this location has historically been cultivated for agricultural purposes and reported that there was no evidence of any wetland or other sensitive plant or wildlife areas remaining onsite. No wetland features were identified during a preliminary wetland delineation of the area in December 2012. The previous agricultural use has displaced native species of plants and animals except those varieties capable of co-existing with humans in urban settings. The post-project use of the site will be a community park and stormwater detention basin facility.

Oroville Wildlife Area Dredge Tailings Area - This site is within the Oroville Wildlife Area and consists of several mounds of dredge tailings waterside of the existing levee. The material is suitable for use in seepage berms in **Reach D**. The availability of tailings in the area should be sufficient to meet the total deficit for berm material in these reaches. The excavation of the material will be coordinated to maximize hydraulic benefits from the reshaping of the overbank area. The site also represents an opportunity to provide waterside habitat enhancements. The useful area of this site could be about 75 acres and the depth of excavation could be upwards of 10 feet. The yield of material from this site could be 375,000 cubic yards. Hauling from this site will not take place on public roads. It is anticipated the contractor will use an existing waterside levee ramp (or create one), directly accessing the levee patrol road. The future land use for this site will be similar to its present day use (managed habitat area).

Construction Timing

Specific sequencing of construction will be dynamic throughout planning and design of the **Proposed Project**, subject to change based on factors including the following.

- Further engineering in determining the clarity and efficacy of site-specific measures.
- Easement and right-of-way acquisition (where necessary).
- Availability of proximate, suitable, and cost-effective borrow material.
- Environmental clearances based on wildlife presence, lifecycle activity, and location of habitats.

Based on current planning analysis for the **Proposed Project**, construction will occur in more than one annual construction season (typically April 15 to November 30, subject to conditions). Although subject to change, the four **reaches would be constructed over a period of 6 years**.

Construction is anticipated to occur in single 10-hour shifts, 6 days per week. An exception to this schedule is slurry cutoff wall construction, which is anticipated to occur in two 10-hour shifts (essentially 24-hour construction), 6 days per week. While actual construction will not occur between the two 10-hour shifts, equipment maintenance and preparations for the upcoming work shift will occur.

Post-Construction Operation and Maintenance

Upon project completion, the project will be turned over to California Department of Water Resources (DWR), SBFCA and the local reclamation districts for operations, maintenance, repair, replacement, and rehabilitation (OMRR&R). The Corps will provide an addendum to the O&M manual, which summarizes the duties necessary for proper operation of the project. The addendum has not yet been written and therefore, effects to listed species and conservation measures have not been analyzed or developed. The Corps will re-initiate consultation with the Service on the addendum when it is developed and prior to turning the project over to DWR, SBFCA, and the local reclamation districts.

General operation and maintenance activities include:

- **Vegetation removal and control;**
- **Rodent control and repair of rodent damage;**
- **Slope regrading and reseeded;**
- **Repair of waterside erosion;**
- **Maintenance of relief wells and collection ditches;**
- **Maintenance and repair of flap gates and closure structures; and**
- **Road/ramp maintenance.**

Conservation Measures

SBFCA and/or the Corps will implement the following conservation measures to avoid and minimize effects on federally listed species. To ensure their implementation, the measures listed below will be included in the project specifications.

General

Conservation Measure 1: Conduct Mandatory Biological Resources Awareness Training for All Project Personnel and Implement General Requirements

Before any ground-disturbing work (including vegetation clearing and grading) occurs in the Action Area, a Service-approved biologist will conduct a mandatory biological resources awareness training for all construction personnel about federally-listed species that could potentially occur onsite (beetle and snake). The training will include the natural history, representative photographs, and legal status of each federally-listed species and avoidance and minimization measures to be implemented. Proof of personnel attendance will be provided to the Service within 1 week of the training. If new construction personnel are added to the project, the contractor will ensure that the new personnel receive the mandatory training before starting work. The subsequent training of personnel can include videotape of the initial training and/or the use of written materials rather than in-person training by a biologist. Requirements that will be followed by construction personnel are listed below.

- Where suitable habitat is present for listed species, SBFCA and/or the Corps will clearly delineate the construction limits through the use of survey tape, pin flags, orange barrier fencing, or other means, and prohibit any construction-related traffic outside these boundaries.

- Project-related vehicles will observe the posted speed limit on hard-surfaced roads and a 10-mile-per-hour speed limit on unpaved roads during travel in the project construction area. Project-related vehicles and construction equipment will restrict off-road travel to the designated construction areas.
- All food-related trash will be disposed of in closed containers and removed from the project construction area at least once per week during the construction period.
- Construction personnel will not feed or otherwise attract fish or wildlife to the project site.
- No pets or firearms will be allowed in the project construction area.
- To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service vehicles or construction equipment outside designated staging areas.
- Any worker who inadvertently injures or kills a federally-listed species or finds one dead, injured, or entrapped will immediately report the incident to the biological monitor and construction foreman. The construction foreman will immediately notify SBFCA **and/or the Corps**, who will provide verbal notification to the Sacramento Fish and Wildlife Office and the local CDFW warden or biologist within 1 working day. SBFCA **and/or the Corps** will follow up with written notification to Service and CDFW within 5 working days. The biological monitor will follow up with SBFCA **and/or the Corps** to ensure that the wildlife agencies were notified.
- The biological monitor will record all observations of federally-listed species on California Natural Diversity Database (CNDDB) field sheets and submit to CDFW.

Valley Elderberry Longhorn Beetle

Conservation measures for the beetle are based on the Service's 1999 *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Conservation Guidelines) (U.S. Fish and Wildlife Service 1999a).

Conservation Measure 2: Fence Elderberry Shrubs to be Protected and Monitor Fencing during Construction

Elderberry shrubs/clusters within 100 feet of the construction area that will not be removed will be protected during construction. A qualified biologist (i.e., with elderberry/beetle experience), under contract to SBFCA **or the Corps**, will mark the elderberry shrubs and clusters that will be protected during construction. Orange construction barrier fencing will be placed at the edge of the respective buffer areas. The buffer area distances will be proposed by the biologist and approved by the Service. No construction activities will be permitted within the buffer zone other than those activities necessary to erect the fencing. Signs will be posted every 50 feet (15.2 meters) along the perimeter of the buffer area fencing. The signs will contain the following information:

This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.

In some cases, where the elderberry shrub dripline is within 10 feet of the work area, k-rails will be placed at the shrub's dripline to provide additional protection to the shrub from construction equipment and activities. Temporary fences around the elderberry shrubs and k-rails at shrub driplines will be installed as the first order of work. Temporary fences will be furnished, constructed, maintained, and later removed, as shown on the plans, as specified in the special provisions, and as directed by the project engineer. Temporary fencing will be 4 feet (1.2 meters) high, commercial-quality woven polypropylene, orange in color.

Buffer area fences around elderberry shrubs will be inspected weekly by a qualified biological monitor during ground-disturbing activities and monthly after ground-disturbing activities until project construction is complete or until the fences are removed, as approved by the biological monitor and the resident engineer. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrubs throughout construction. Biological inspection reports will be provided to the project lead and the Service.

Conservation Measure 3: Conduct Beetle Surveys Prior to Elderberry Shrub Transplantation

Surveys of elderberry shrubs to be transplanted will be conducted by a qualified biologist prior to transplantation. Surveys will be conducted in accordance with the Conservation Guidelines (U.S. Fish and Wildlife Service 1999a). The biologist will survey the area surrounding the shrub to be transplanted to ensure that there are not additional elderberry shrubs that need to be removed. Surveys will consist of counting and measuring the diameter of each stem, and examining elderberry shrubs for the presence of beetle exit holes. Survey results and an analysis of the number of elderberry seedlings/cuttings and associated native plants based on the survey results will be submitted to the Service. **SBFCA and/or the Corps** plan to plant elderberry seedlings/cuttings and associated native plants prior to transplantation of elderberry shrubs. The data collected during the surveys prior to transplantation will be used to determine if SFBFA is exceeding their compensation needs or if additional plantings are necessary. Because the Proposed Action will be constructed in four separate contracts, elderberry survey data for each contract will be used to rectify any discrepancies in compensation for the previous contract and to ensure that **SBFCA and/or the Corps** has minimized effects to the beetle.

Conservation Measure 4: Water Down Construction Area to Control Dust

SFBFA, **Corps**, or the contractor will ensure that the project construction area will be watered down as necessary to prevent dirt from becoming airborne and accumulating on elderberry shrubs within the 100-foot buffer.

Conservation Measure 5: Compensate for Direct and Indirect Effects on Valley Elderberry Longhorn Beetle Habitat

Before construction begins, **SBFCA and/or the Corps** will compensate for direct effects on elderberry shrubs by transplanting shrubs that cannot be avoided to a Service-approved conservation area (described below). Elderberry seedlings or cuttings and associated native species will also be planted in the conservation area. Each elderberry stem measuring 1 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) will be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from

1:1 to 8:1 (new plantings to affected stems). The numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether the shrub lies in a riparian or non-riparian area. Stock of either seedlings or cuttings will be obtained from local sources (including the Action Area if acceptable to the Service).

At the discretion of the Service, shrubs that are unlikely to survive transplantation because of poor condition or location, or a plant that will be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible, compensation ratios will be increased to offset the additional habitat loss.

The relocation of the elderberry shrubs will be conducted according to Service-approved procedures outlined in the Conservation Guidelines (U. S. Fish and Wildlife Service 1999a). Elderberry shrubs within the project construction area that cannot be avoided will be transplanted during the plant's dormant phase (November through the first 2 weeks of February). A qualified biological monitor will remain onsite while the shrubs are being transplanted.

Property inaccessibility and the high density of vegetation along portions of the Feather River riparian corridor limited the number of elderberry shrubs that could be surveyed (73 shrubs were surveyed). For this reason, compensation for the removal of **162** shrubs was estimated based on the average number of stems in each stem diameter range for the 73 shrubs that could be surveyed. Those average shrub stem counts are as follows.

- Number of stems ≥ 1 inch and ≤ 3 inches = 4.
- Number of stems > 3 inches and < 5 inches = 1.
- Number of stems ≥ 5 inches = 1.

Table 1 shows the estimated compensation. Because the shrubs are located in riparian habitat and did not have exit holes, the compensation ratios for these conditions were used. As noted in Table 1, one elderberry shrub will need to be transplanted prior to the start of work in 2013 (in Reach 13) and outside of the elderberry dormancy period.

Based on the information in Table 1, the conservation area will be at least **21.07** acres in size to accommodate about **162** elderberry shrubs, **2,550** elderberry cuttings or seedlings, and **2,550** native plants. The conservation area in which the transplanted elderberry shrubs and seedlings are planted will be protected in perpetuity as habitat for the beetle.

Evidence of beetle occurrence in the conservation area, the condition of the elderberry shrubs in the conservation area, and the general condition of the conservation area itself will be monitored over a period of 10 consecutive years or for 7 years over a 15-year period from the date of transplanting. SBFCA and/or the Corps will be responsible for funding and providing monitoring reports to the Service in each of the years in which a monitoring report is required. As specified in the Conservation Guidelines, the report will include information on timing and rate of irrigation, growth rates, and survival rates and mortality.

Table 1. Elderberry Stem Sizes and Compensation

Location	Stems (maximum diameter at ground level)	Exit Hole on Shrub (Yes or No)	Elderberry Seedling Ratio	Associated Native Plant Ratio	Multiplier for transplanting between June 15 – August 15	Number of Stems	Required Elderberry Plantings	Required Associated Native Plant Plantings
Riparian	stems $\geq 1''$ & $\leq 3''$	No	2:1	1:1	No	648	1,296	1,296
Riparian	stems $> 3''$ & $< 5''$	No	3:1	1:1	No	162	486	486
Riparian	stems $> 5''$	No	4:1	1:1	No	162	648	648
2013 Construction - Reach 13								
Riparian	stems $\geq 1''$ & $\leq 3''$	No	2:1	1:1	2.5	1	5	5
Riparian	stems $> 3''$ & $< 5''$	No	3:1	1:1	2.5	2	15	15
Riparian	stems $> 5''$	No	4:1	1:1	2.5	10	100	100
Total replacement plantings							2,550	2,550
Total elderberry shrubs to be transplanted								162
5,100 / 10 = 510 valley elderberry longhorn beetle credits or 21.07 acres								

To meet the success criteria specified in the Conservation Guidelines, a minimum survival rate of 60% of the original number of elderberry replacement plantings and associated native plants must be maintained throughout the monitoring period.

Proposed Conservation Area

SBFCA and Corps proposes to transplant elderberry shrubs to the existing 48.5-acre Star Bend Conservation Area, located on the west levee of the Feather River, about 6 miles south of Yuba City. In 2009, Levee District 1 of Sutter County proposed to construct the Feather River Setback Levee and Habitat Enhancement Project at Star Bend to replace a portion of existing levee that poses a high risk of failure in order to decrease the flood stage, velocity, and scour potential; increase and improve floodplain habitat; and improve habitat connectivity between the Abbot Lake and O'Connor Lakes Units of CDFW's Feather River Wildlife Area. The Star Bend project created 48.5 acres of floodplain habitat, which included habitat enhancement and onsite compensation for impacted elderberry shrubs.

In 2009, River Partners and Stillwater Sciences prepared a *Habitat Enhancement Plan for the Feather River Setback Levee and Habitat Enhancement Project at Star Bend* to be implemented by Levee District 1. It provides further information on the conditions at the time the site was proposed. About 20 acres have been used for elderberry transplants and associated native plants. In early 2012, a fire at the Star Bend site damaged portions of the site; however, elderberry shrub planting losses were minimal. The remaining 28.5 acres are available at the conservation area for compensating for impacts on elderberry shrubs from construction of the **Proposed Project**.

The long-term goal of the conservation area is to merge this area with CDFW's adjoining O'Conner Lakes and Abbott Lakes Wildlife Units. **SBFCA and/or the Corp** will prepare a mitigation and monitoring plan for the 28.5 acres that are available and will be used as a conservation area for effects to the beetle, as well as riparian impacts. This plan is currently being coordinated with the Service, Corps, and CDFW. Additionally, **SBFCA and/or the Corps** will obtain a conservation easement for the 28.5 acre conservation area.

Giant Garter Snake

Conservation Measure 6: Conduct Construction Activities during the Active Period for Giant Garter Snake

Construction activity within giant garter snake aquatic and upland habitat (200 feet of aquatic habitat) will be conducted during the snake's active period (May 1–October 1). During this timeframe, potential for injury and mortality are lessened because snakes are actively moving and avoiding danger. The only work that will be conducted outside of the active season is levee slope flattening within the Sutter-Butte Canal in Reaches 26–28 (scheduled for 2016) and pipe reconstruction at two sites in the same reaches because these activities must be conducted when the canal is dry (February–March). Additional protective measures will be implemented at these locations (see Conservation Measure 14 below).

Conservation Measure 7: Install and Maintain Exclusion and Construction Barrier Fencing around Suitable Giant Garter Snake Habitat

To reduce the likelihood of giant garter snakes entering the construction area, **SBFCA and/or the Corps** will install exclusion fencing and orange construction barrier fencing along the portions of the construction area that are within 200 feet of suitable aquatic and upland habitat. The exclusion and construction barrier fencing will be installed during the active period for giant garter snakes (May 1–October 1) to reduce the potential for injury and mortality during this activity.

The construction specifications will require that **SBFCA, the Corps**, or its contractors retain a qualified biologist to identify the areas that are to be avoided during construction. Areas adjacent to the directly affected area required for construction, including staging and access, will be fenced off to avoid disturbance in these areas. Before construction, the contractor will work with the qualified biologist to identify the locations for the barrier fencing and will place flags or flagging around the areas to be protected to indicate the locations of the barrier fences. The protected area will be clearly identified on the construction specifications. The fencing will be installed the maximum distance practicable from the aquatic habitat areas and will be in place before construction activities are initiated.

The exclusion fencing will consist of 3-foot-tall silt fencing buried 6 inches below ground level. The exclusion fencing will ensure that giant garter snakes are excluded from the construction area and that suitable upland and aquatic habitat is protected throughout construction. The construction barrier fencing will be commercial-quality, woven polypropylene, orange in color, and 4 feet high (Tensor Polygrid or equivalent). The fencing will be tightly strung on posts with a maximum of 10-foot spacing.

Barrier and exclusion fences will be inspected daily by a qualified biological monitor during ground-disturbing activities and weekly after ground-disturbing activities until project construction is complete or until the fences are removed, as approved by the biological monitor and the resident engineer. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around giant garter snake habitat throughout construction. Biological inspection reports will be provided to the project lead and the Service.

Conservation Measure 8: Minimize Potential Impacts on Giant Garter Snake Habitat

SBFCA **and/or the Corps** will implement the following measures to minimize potential impacts on giant garter snake habitat.

- Staging areas will be located at least 200 feet from suitable giant garter snake habitat.
- Any dewatered habitat will remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
- Vegetation clearing within 200 feet of the banks of suitable giant garter snake aquatic habitat will be limited to the minimum area necessary. Avoided giant garter snake habitat within or adjacent to the Action Area will be flagged and designated as an environmentally sensitive area, to be avoided by all construction personnel.
- The movement of heavy equipment within 200 feet of the banks of suitable giant garter snake aquatic habitat will be confined to designated haul routes to minimize habitat disturbance.

Conservation Measure 9: Prepare and Implement a Stormwater Pollution Prevention Plan

SBFCA **and/or the Corps** will prepare a stormwater pollution prevention plan (SWPPP) that describes the BMPs that will be implemented to control accelerated erosion, sedimentation, and other pollutants during and after project construction. The SWPPP will be prepared prior to commencing earth-moving construction activities. This will also comply with the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System general construction activity stormwater permit.

The specific BMPs that will be incorporated into the erosion and sediment control plan and SWPPP will be site-specific and will be prepared by the construction contractor in accordance with the California Regional Water Quality Control Board Field Manual. However, the plan likely will include, but not be limited to, one or more of the following standard erosion and sediment control BMPs.

- **Timing of construction.** The construction contractor will conduct all construction activities during the typical construction season to avoid ground disturbance during the rainy season.
- **Staging of construction equipment and materials.** To the extent possible, equipment and materials will be staged in areas that have already been disturbed.
- **Minimize soil and vegetation disturbance.** The construction contractor will minimize ground disturbance and the disturbance/destruction of existing vegetation. This will be accomplished in part through the establishment of designated equipment staging areas,

ingress and egress corridors, and equipment exclusion zones prior to the commencement of any grading operations.

- **Stabilize grading spoils.** Grading spoils generated during the construction will be temporarily stockpiled in staging areas. Silt fences, fiber rolls, or similar devices will be installed around the base of the temporary stockpiles to intercept runoff and sediment during storm events. If necessary, temporary stockpiles may be covered with an appropriate geotextile to increase protection from wind and water erosion.
- **Install sediment barriers.** The construction contractor may install silt fences, fiber rolls, or similar devices to prevent sediment-laden runoff from leaving the construction area. Natural/biodegradable erosion control measures (i.e., coir rolls, straw wattles or hay bales) will be used. Plastic monofilament netting (erosion control matting) will not be allowed because animals can become caught in this type of erosion control material.
- **Stormwater drain inlet protection.** The construction contractor may install silt fences, drop inlet sediment traps, sandbag barriers, and/or other similar devices.
- **Permanent site stabilization.** The construction contractor will install structural and vegetative methods to permanently stabilize all graded or otherwise disturbed areas once construction is complete. Structural methods may include the installation of biodegradable fiber rolls and erosion control blankets. Vegetative methods may involve the application of organic mulch and tackifier and/or the application of an erosion control seed mix. Implementation of a SWPPP will substantially minimize the potential for project-related erosion and associated adverse effects on water quality.

Conservation Measure 10: Prepare and Implement a Bentonite Slurry Spill Contingency Plan (Frac-Out Plan)

Before excavation begins, SBFCA and/or the Corps will ensure the contractor will prepare and implement a bentonite slurry spill contingency plan (BSSCP) for any excavation activities that use pressurized fluids (other than water). The plan will be subject to approval by the Corps, Service, and SBFCA before excavation can begin. The BSSCP will include measures intended to minimize the potential for a frac-out (short for “fracture-out event”) associated with excavation and tunneling activities; provide for the timely detection of frac-outs; and ensure an organized, timely, and “minimum-effect” response in the event of a frac-out and release of excavation fluid (i.e., bentonite). The BSSCP will require, at a minimum, the following measures.

- If a frac-out is identified, all work will stop, including the recycling of the bentonite fluid. In the event of a frac-out into water, the location and extent of the frac-out will be determined, and the frac-out will be monitored for 4 hours to determine whether the fluid congeals (bentonite will usually harden, effectively sealing the frac-out location).
- NMFS, the Service, CDFW, and the RWQCB will be notified immediately of any spills and will be consulted regarding clean-up procedures. A Brady barrel will be onsite and used if a frac-out occurs. Containment materials, such as straw bales, also will be onsite prior to and during all operations, and a vacuum truck will be on retainer and available to be operational onsite within notice of 2 hours. The site supervisor will take any necessary follow-up response actions in coordination with

agency representatives. The site supervisor will coordinate the mobilization of equipment stored at staging areas (e.g., vacuum trucks) as needed.

- If the frac-out has reached the surface, any material contaminated with bentonite will be removed by hand to a depth of 1-foot, contained, and properly disposed of, as required by law. The drilling contractor will be responsible for ensuring that the bentonite is either properly disposed of at an approved Class II disposal facility or properly recycled in an approved manner.
- If the bentonite fluid congeals, no other actions, such as disturbance of the streambed, will be taken that will potentially suspend sediments in the water column.
- The site supervisor has overall responsibility for implementing this BSSCP. The site supervisor will be notified immediately when a frac-out is detected. The site supervisor will be responsible for ensuring that the biological monitor is aware of the frac-out, coordinating personnel, response, cleanup, regulatory agency notification and coordination to ensure proper clean-up, disposal of recovered material, and timely reporting of the incident. The site supervisor will ensure all waste materials are properly containerized, labeled, and removed from the site to an approved Class II disposal facility by personnel experienced in the removal, transport, and disposal of drilling mud.
- The site supervisor will be familiar with the contents of this BSSCP and the conditions of approval under which the activity is permitted to take place. The site supervisor will have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. The site supervisor will ensure that a copy of this plan is available (onsite) and accessible to all construction personnel. The site supervisor will ensure that all workers are properly trained and familiar with the necessary procedures for response to a frac-out, prior to commencement of excavation operations.

Conservation Measure 11: Prepare and Implement a Spill Prevention, Control, and Counter-Measure Plan

A spill prevention, control, and counter-measure plan (SPCCP) is intended to prevent any discharge of oil into navigable water or adjoining shorelines. **SBFCA, the Corps**, or its contractor will develop and implement an SPCCP to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during construction and operation activities. The SPCCP will be completed before any construction activities begin. Implementation of this measure will comply with State and Federal water quality regulations. The SPCCP will describe spill sources and spill pathways in addition to the actions that will be taken in the event of a spill (e.g., an oil spill from engine refueling will be immediately cleaned up with oil absorbents). The SPCCP will outline descriptions of containments facilities and practices such as doubled-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures and spill response kits. It will also describe how and when employees are trained in proper handling procedure and spill prevention and response procedures.

SBFCA and the Corps will review and approve the SPCCP before onset of construction activities and routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained. **SBFCA and/or the Corps** will notify its contractors immediately if there is a non-compliance issue and will require compliance.

The Federal reportable spill quantity for petroleum products, as defined in 40 CFR 110, is any oil spill that results in one or more of the following.

- Violates applicable water quality standards.
- Causes a film or sheen on or discoloration of the water surface or adjoining shoreline.
- Causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

If a spill is reportable, the contractor's superintendent will notify **SBFCA and/or the Corps**, and they will take action to contact the appropriate safety and cleanup crews to ensure that the SPCCP is followed. A written description of reportable releases must be submitted to the Central Valley RWQCB. This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases will be documented on a spill report form.

Conservation Measure 12: Conduct Preconstruction Surveys and Monitoring for Giant Garter Snake

Prior to ground-disturbing activities within 200 feet of suitable habitat, a Service-approved biological monitor will conduct a preconstruction survey of suitable aquatic and upland habitat and inspect exclusion and orange barrier fencing to ensure they are both in good working order each morning. If any snakes are observed within the construction area at any other time during construction the Service-approved biological monitor will be contacted to survey the site for giant garter snakes. The biological monitor will have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities will be allowed to move away from construction activities on their own. If unable to move away on their own, trapped or injured giant garter snakes will be only be removed by a biologist with a federal 10(a)1(A) permit which allows them to handle the snake and will be placed in a location determined through discussions with the Service. The biological monitor will immediately report the finding of a snake to the Service by phone and will provide a written account of the details of the incident within 24 hours.

Once all initial ground-disturbing activities are completed, the biological monitor will perform weekly checks of the site for the duration of construction in order to ensure that construction barrier fences and exclusion fences are in good order, trenches are being covered, project personnel are conducting checks beneath parked vehicles prior to their movement, and that all other required biological protection measures are being complied with. The biological monitor will document the results of monitoring on construction monitoring log sheets, which will be provided to the Service within 1 week of each monitoring visit.

Conservation Measure 13: Provide Escape Ramps or Cover Open Trenches at the End of Each Day

To avoid entrapment of giant garter snakes, thereby preventing injury or mortality resulting from falling into trenches, all excavated areas more than 1 foot deep will be provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each workday. If escape ramps cannot be provided, then holes or trenches will be covered with plywood or other hard material. The biological monitor or construction personnel designated by the contractor will be responsible for thoroughly inspecting trenches for the presence of giant garter snakes at the beginning of each workday. Capture and relocation of trapped or injured individuals can only be attempted by personnel or individuals with current Service recovery permits pursuant to section 10(a)1(A) of the Act.

Conservation Measure 14: Implement Additional Protective Measures during Work in Suitable Habitat during the Giant Garter Snake Dormant Period

SBFCA and/or the Corps will implement additional protective measures during time periods when work must occur during the giant garter snake dormant period (October 2–April 30), when snakes are more vulnerable to injury and mortality. It is expected that these additional measures will be implemented during levee slope flattening within the Sutter-Butte Canal in Reaches 26–28 (scheduled for 2016) and pipe reconstruction adjoining the canal at two sites in the same reaches during February–March, and if construction activities extend to the period between October 2 and November 1. **SBFCA and/or the Corps** will implement additional protective measures when conducting work in suitable giant garter snake habitat between October 2 and April 30.

- A full-time Service-approved biological monitor will be onsite for the duration of construction activities.
- All emergent vegetation within the Sutter-Butte Canal on the levee side, and vegetation within 200 feet of the canal will be cleared prior to the giant garter snake hibernation period (i.e., vegetation clearing must be completed by October 1 for following winter work).
- Exclusion fencing will be installed around the perimeter of the work area and across the Sutter-Butte Canal where construction activities associated with levee slope flattening and pipe reconstruction activities will occur. The fencing should enclose the work area to the maximum extent possible to prevent giant garter snakes from entering the work area. Fencing will be installed during the active period for giant garter snakes (May 1–October 1) to reduce the potential for injury and mortality during fence installation. The Service-approved biological monitor will work with the contractor to determine where fencing should be placed and will monitor fence installation. The exclusion fencing will consist of 3-foot-tall erosion fencing buried 4–6 inches below ground level. The exclusion fencing will minimize opportunities for giant garter snake hibernation in the adjacent upland area (between canal and existing levee).
- Portions of the Sutter-Butte Canal that are temporarily disturbed during construction will be revegetated with emergent vegetation and adjacent disturbed upland habitat will be revegetated with native grasses and forbs after construction is complete.

Conservation Measure 15: Restore Temporarily Disturbed Aquatic and Upland Habitat to Pre-Action Conditions

Upon completion of the proposed project, SBFCA **and/or Corps** will restore 42.52 acres of suitable aquatic habitat and 118.80 acres of suitable upland habitat for the giant garter snake to pre-project conditions. Restoration of aquatic vegetation and annual grassland will be detailed in a mitigation and monitoring plan that will be reviewed and approved by the Corps and Service prior to the start of construction. Habitat will be restored within one season (defined as May 1–October 1) and providing vegetative cover within 1 year of construction beginning in that area.

Conservation Measure 16: Compensate for Permanent Loss of Aquatic Habitat for Giant Garter Snake

SBFCA/Corps will compensate for the permanent loss of 0.004 acre of suitable aquatic habitat **and 3.54 acres of suitable upland habitat** for giant garter snake by purchasing preservation credits equal to **10.632** acres of giant garter snake habitat at Westervelt Ecological Services' Sutter Basin Conservation Bank in Sutter County or **another Service approved conservation bank**. This bank has available giant garter snake credits and is approved by both the Service and CDFW.

The **10.632** acres of habitat at the conservation bank will be protected in perpetuity for giant garter snake. Prior to the start of construction (excluding Reach 13, as there is no giant garter snake habitat in this reach), SBFCA will provide funding to Westervelt Ecological Services for credits equivalent to 0.012 acre of giant garter snake habitat at the Sutter Basin Conservation Bank. **Prior to the Corps beginning construction, they will purchase 10.62 acres of giant garter snake habitat at a Service approved conservation bank.** SBFCA and/or the Corps will provide the Service and CDFW with copies of the credit sale agreement and fund transfer.

Conservation Measure 17: Avoid and Minimize Potential Maintenance Impacts on Suitable Habitat for Giant Garter Snake

The Corps will coordinate with the Service and CDFW on the development of the addendum to the O&M manual. Maintenance activities will likely affect potential giant garter snake upland habitat. The Corps will work with the Service and CDFW to develop conservation measures to reduce the effects to giant garter snakes due to maintenance activities.

Analytical Framework for the Jeopardy Analysis

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species*, which evaluates the beetle's and snake's range-wide condition, the factors responsible for that condition, and their survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the beetle and the snake in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the beetle and snake; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed federal action and the effects of any

interrelated or interdependent activities on the beetle and snake; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the beetle and snake.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the beetle's and snake's current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the beetle and snake.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the beetle and snake and the role of the action area in the survival and recovery of the beetle and snake as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Status of the Species

Valley Elderberry Longhorn Beetle

Please refer to the *Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus) 5-year Review: Summary and Evaluation* (Service 2006) for the current status of the species.

Giant Garter Snake

Please refer to the *Giant Garter Snake (Thamnophis gigas) 5-year Review: Summary and Evaluation* (Service 2012) for the current status of the species.

Environmental Baseline

Valley Elderberry Longhorn Beetle

The closest beetle occurrence in the CNDDDB (2013) is about 0.5 mile from the proposed project. Suitable habitat for the beetle (in the form of elderberry shrubs) exists in numerous places along the 41 miles of proposed levee repair. A total of 267 elderberry shrubs were mapped within the action area. Many others exist at various locations between the levee and the river. Of these, **SBFCA and the Corps** are proposing to avoid **105** elderberry shrubs and transplant **162** elderberry shrubs. Because the action area is within the range of the species, there are known occurrences from the vicinity of the action area, and suitable habitat is present, the Service concludes that it is reasonably likely for the beetle to occupy the action area.

Giant Garter Snake

The *Draft Recovery Plan for the Giant Garter Snake* subdivides the range of the species into four recovery units (Service 1999b). The action area for the proposed project is located within the Sacramento Valley Recovery Unit. There are 20 records of the snake within 5 miles of the action area. The closest occurrence documented in the CNDDDB is 2 miles from the action area.

Snakes have the potential to occur within the action area because suitable aquatic and upland habitat is present as it is hydrologically connected to areas that support rice agriculture and areas where the snake has previously been detected. The action area is a long corridor that occasionally has irrigation ditches, which run parallel to the levee for limited stretches. The main threat to the snake in the action area is loss of habitat or connectivity due to channel and levee maintenance.

Effects of the Proposed Action

Valley Elderberry Longhorn Beetle

One hundred sixty-two elderberry shrubs will be removed and transplanted. The **162** affected shrubs have **649** stems between 1 and 3 inches, **164** stems between 3 and 5 inches and **172** stems greater than 5 inches at ground level.

Loss of an elderberry shrub or even a stem can affect the beetle breeding and feeding because adult beetles rely solely on elderberry foliage and flowers for food and must lay their eggs on elderberry stems to successfully reproduce.

Transplantation of elderberry shrubs that are or could be used by beetle larvae is expected to adversely affect the beetle. Beetle larvae will be killed or the beetle's life cycle will be interrupted during or after the transplanting process. For example:

1. Transplanted elderberry shrubs may experience stress or become unhealthy due to changes in soil, hydrology, microclimate, or associated vegetation. This may reduce their quality as habitat for the valley elderberry longhorn beetle, or impair their production of habitat-quality stems in the future.
2. Elderberry shrubs may die as a result of transplantation.
3. Branches containing larvae may be cut, broken, or crushed as a result of the transplantation process.

SBFCA has proposed to transplant one shrub outside of the elderberry shrub's dormant season (November 1 to February 15). To offset the increased risk of the transplantation not being successful SBFCA has proposed to plant 2.5 times the number of elderberry seedlings at the Star Bend Conservation Area.

Temporal loss of habitat will occur. Although conservation measures for effects on the beetle will involve creation or restoration of habitat, it generally takes five or more years for elderberry plants to become large enough to support beetles, and it may take 25 years or longer for riparian habitats to reach their full value. Temporal loss of habitat may cause fragmentation of habitat and isolation of subpopulations.

Permanent and temporary habitat loss adversely affects the beetles breeding and foraging requirements. Habitat creation and transplantation of the shrubs will minimize these effects. Success of a restoration site has been linked to presence of transplanted elderberry shrubs that

have served to colonize a newly created riparian habitat. Transplants that survive also provide diversity within the conservation area as they are older, larger shrubs within the plantings of young small elderberry seedlings. The Star Bend Conservation Area will be protected with a conservation easement and managed in perpetuity for riparian habitat including valley elderberry longhorn beetle habitat, through development of the *Feather River West Levee Project Mitigation and Monitoring Plan*.

Given the amount of vegetation removal with this project, woody vegetation will be removed from the easement area. Thereafter, yearly maintenance would maintain the levee slopes and easement area as either grassland or maintenance road. Elderberry shrubs do not provide habitat for the valley elderberry longhorn beetle when less than 1-inch at ground level. Provided the levee maintainers remove woody vegetation including elderberry shrubs when young and less than 1-inch in diameter at ground level there should be no long-term effects of levee maintenance on valley elderberry longhorn beetles.

Giant garter snake

Aquatic habitat for the snake near the levee construction varies along the 41 miles of the proposed project. Small areas of aquatic habitat are present in **Reaches A and C** and they are hydrologically connected to areas that support habitat for the snake (rice). **Reach D** has the largest amount of snake aquatic habitat as the Sutter Butte Canal parallels the levee for longer lengths. Canal filling due to cutoff wall construction will permanently fill 0.004 acre of snake aquatic habitat. Upland habitat around this aquatic habitat will be temporarily disturbed but returned to pre-project condition within one year. Temporary effects will result from temporary fill of aquatic habitat for construction access, reshaping the slope of the Sutter Butte Canal and adjacent levee, and degradation and reconstruction of the levee. **The Sutter Butte Canal will be relocated in two locations for a total of 1,683 linear feet to allow space for the placement of an operation and maintenance road. The new canal will be constructed in advance of canal filling. Creating aquatic habitat in advance of filling the existing habitat will allow aquatic habitat to be available for the snake at all times. The work will be done during the active period for the snake so disturbance of upland habitat to create the aquatic would minimize effects to the snake given that the snake can more easily move away from the construction.** These activities will temporarily affect 11.9 acres of aquatic habitat. **In three other locations, the levee would be moved away from the Sutter Butte Canal.** Levee degradation and reconstruction will temporarily affect 112.47 acres of upland habitat. All temporarily affected areas will be restored to pre-project conditions within the same year the disturbance will occur. This will minimize effects to giant garter snakes because the amount of time the habitat will be unavailable to the snake will be minimized. Permanently affected habitat, such as the canals that will be made smaller will be offset by purchasing 0.012 acre of giant garter snake habitat at Westervelt Ecological Services' Sutter Basin Conservation Bank in Sutter County. None of the borrow sites in the project description have upland or aquatic giant garter snake habitat.

The majority of the construction work will occur during the giant garter snake active season (May 1 to October 1). Increased construction activity in areas where snakes are known to occur could expose snakes to increased risks of injury and mortality from predation, exposure, vehicular traffic, and construction equipment. Because snakes are more mobile during the active season, these effects should be lessened. There are a few activities which SBFCA could not

construct during the active season. Because of cooler temperatures in the inactive season (October 1 to May 1), the snake is not as mobile and is most frequently found within burrows. Ground disturbing activities during this timeframe will increase the likelihood of snake mortality when the burrows are disturbed with heavy equipment. SBFCA has proposed to disturb (clear and grub) the out of season work area and place exclusion fencing around the work area during the active season which will create an area that will not support overwintering snakes (lack of burrows). This will minimize the chance of injuring or killing an overwintering snake during out of season construction. This will only occur on one side of the canal, leaving the other side of the canal available as overwintering habitat for the snake.

Placement of erosion matting will permanently cover 3.54 acres of upland giant garter snake habitat, reducing its use to the snake by disallowing the creation of ground squirrel burrows. Snakes use the burrows year round for thermoregulation and hibernacula. The loss of this area would mean that snakes would have to move further to find areas for refuge and may be at a greater risk of predation. The Corps has proposed to offset the loss of this habitat by purchasing 10.62 acres of giant garter snake habitat at a Service approved conservation bank.

Temporary effects within the action area will affect both aquatic and upland snake habitat. In some locations degradation of the levee could cause soil to fall into the aquatic habitat or fuel or oil leaks could also adversely affect the habitat and the snake. Placement of sediment fencing and implementing sediment and contaminant BMPs will lessen this effect. Levee degradation will temporarily make upland habitat unavailable to the snake during the active season. Snakes use upland habitat for thermoregulation both as a place to bask and as a place to escape extreme heat (burrows) and cover for shedding and giving birth to young. While snakes are more active during the summer months and more likely to move away from construction, some snakes may choose to remain where they are and therefore will be subject to mortality when construction activities are occurring. In addition to direct mortality, the upland habitat will be temporarily unavailable to the snake during construction. Even once construction is completed it will take a year or two for the upland habitat to become completely functional for the snake, with burrows or crevices available for them to use. This is likely to result in disturbance, displacement, injury, and/or mortality of snakes. To lessen these effects SBFCA is implementing the conservation measures described above as well as affecting only one side of the canal. This will leave the other side of the canal intact and available to the snake for use, minimizing displacement of snakes. Additionally, because of the staging of construction not all of the upland habitat will be unavailable for use at one time. It will be staged as construction progresses through the various reaches.

Long-term operation and maintenance of the levee will have some effects to giant garter snake. At this time, the Corps has not provided a detailed description of the activities that will be carried out by the local levee maintainers. This will be described in the addendum to the operation and maintenance manual. The Corps intends to coordinate with the Service during the development of the addendum and will provide a description of the actions as well as conservation measures to minimize and avoid effects to giant garter snake. Operation and maintenance is less ground disturbing than that which is described as a result of the construction of the project and therefore there will be fewer effects to the giant garter snake. However, the Service cannot determine the extent of the effects nor the

amount of incidental take until the addendum to the operation and maintenance manual is completed and the Corps reinitiates consultation with the Service.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed project are not considered in this section, because they require separate consultation pursuant to section 7 of the Act. Any future land use conversions and routine agricultural practices are not subject to Federal authorization or funding and may alter the habitat or result in take of listed valley elderberry longhorn beetle or giant garter snake and are, therefore, cumulative to the proposed project.

Conclusion

After reviewing the current status of the valley elderberry longhorn beetle and giant garter snake, the environmental baselines for these species, the effects of the proposed project, and the cumulative effects on this species, it is the Service's biological opinion that the **Proposed Project**, as described herein, is not likely to jeopardize the continued existence of these species. Although critical habitat has been designated for the beetle, the proposed action will not affect critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are nondiscretionary for listed species of this biological opinion and must be implemented by the Corps and SBFCA in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Federal agency (1) fails to adhere to the terms and conditions of the incidental take statement, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

Valley Elderberry Longhorn Beetle

The Service expects that incidental take of the valley elderberry longhorn beetle will be difficult to detect or quantify. The cryptic nature of this species and their relatively small body size make the finding of an injured or dead specimen unlikely. The species occurs in habitats that make them difficult to detect. Due to the difficulty in quantifying the number of beetles that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of elderberry stems one inch or greater in diameter at ground level (beetle habitat) that will become unsuitable for beetles due to direct or indirect effects as a result of levee construction. Therefore, the Service estimates that all beetles inhabiting **162** elderberry plants containing stems 1 inch or greater at ground level (**649** stems between 1-3 inches, **164** stems between 3 and 5 inches and **172** stems ≥ 5 inches; see Table 1 in the text) will be taken as a result of the proposed action.

Giant Garter Snake

The Service anticipates that incidental take of the snake will be difficult to detect or quantify for the following reasons: the snake is cryptically colored, secretive, and known to be sensitive to human activities. Snakes may avoid detection by retreating to burrows, soil crevices, vegetation, or other cover. Individual snakes are difficult to detect unless they are observed, undisturbed, at a distance. Most close-range observations represent chance encounters that are difficult to predict. It is not possible to make an accurate estimate of the number of snakes that will be harassed, harmed or killed during construction activities (staging areas, work on canal banks, levee degradation and reconstruction, soil borrow areas, and vehicle traffic to and from borrow areas). **Given the lack of information on the addendum to the operation and maintenance manual, activities associated with this addendum are not included in this biological opinion.** In instances when take is difficult to detect, the Service may use the quantification of acreage as a surrogate for the individuals that will be taken. Therefore, the Service anticipates take incidental to this project as the 3.544 acre of suitable habitat that will be permanently lost and the **124.37** acres (**11.90** acres aquatic and 112.47 acres upland) of suitable snake habitat that will be temporarily lost. Upon implementation of the Reasonable and Prudent Measure, Terms and Conditions, and the Proposed Conservation Measures considered herein, incidental take within this acreage for the proposed project, will be exempt from the prohibitions described under Section 9 of the Act. **Operation and Maintenance activities are not included in the amount of take in this biological opinion.**

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the beetle or snake.

Reasonable and Prudent Measures

The Service has determined that the following reasonable and prudent measure is necessary and appropriate to minimize the adverse effects of the Feather River West Levee Project to the beetle and snake and their habitat in the action area.

1. Minimize the adverse effects to the beetle and snake and their habitat in the action area.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps and SBFCA must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

The following Terms and Conditions implement the Reasonable and Prudent Measure:

1. All the conservation measures as described in the project description, and as restated here in this biological opinion, must be fully implemented and adhered to.
2. The Corps, SBFCA, and PG&E shall include full implementation and adherence to the conservation measures as outlined in the biological opinion as a condition of any permit or contract issued for the project.
3. In order to monitor whether the amount or extent of take anticipated from implementation of the proposed project is approached or exceeded, the Corps and SBFCA shall adhere to the following reporting requirement. Should this anticipated amount or extent of incidental take be exceeded, the Corps must immediately reinstate formal consultation as per 50 CFR 402.16.
 - a. For those components of the proposed project that will result in habitat degradation or modification whereby incidental take in the form of harm or mortality is anticipated, the Corps and SBFCA will provide weekly updates to the Service with a precise accounting of the total acreage of habitat effected or number of elderberry shrubs and size of stems at ground level transplanted. Updates shall also include any information about changes in the Project Description not analyzed in this biological opinion.
4. SBFCA and the Corps shall provide a photo documentation report showing pre- and post-project area conditions for giant garter snake.

Salvage and Disposition of Individuals

The Sacramento Fish and Wildlife Office will be notified within 1 day of the finding of any dead or injured snake or beetle to determine the appropriate measures for salvage and disposition. The Service contact person is the Habitat Conservation Division Chief. In addition, the Recovery Division Chief shall also be notified within 1 day of the procedures implemented for salvage and disposition of the snake or beetle. The applicant must report to the Service immediately any

information about take or suspected take of listed species not authorized in this biological opinion. Notification must include the date, time, and location of the incident or of the finding of a dead or injured listed species. The Habitat Conservation and Recovery Divisions Chiefs can be contacted at (916) 414-6600. The California Department of Fish and Wildlife should also be contacted at (916) 358-2900.

CONSERVATION RECOMMENDATIONS

Conservation recommendations are suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of new information. These measures may serve to further minimize or avoid the adverse effects of a proposed action on listed, proposed, or candidate species, or on designated critical habitat. They may also serve as suggestions on how action agencies can assist species conservation in furtherance of their responsibilities under section 7(a)(1) of the Act, or recommend studies improving an understanding of a species' biology or ecology. Wherever possible, conservation recommendations should be tied to tasks identified in recovery plans. The Service is providing you with the following conservation recommendations:

1. The Corps and SBFCA should assist in the implementation of the draft, and when published, the final Recovery Plan for the snake.
2. The Corps and SBFCA should provide funding to researchers studying topics identified by the Service in the draft, and when published, the final Recovery Plan for the snake.
3. The Corps should use environmental restoration authorities to acquire and restore beetle and snake habitat.

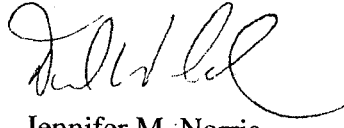
To be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and proposed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation with the Corps on the Feather River West Levee Project. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the proposed action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have any questions regarding this Feather River West Levee Project biological opinion, please contact Jennifer Hobbs, at (916) 414-6541 or Doug Weinrich, Deputy Assistant Field Supervisor, at (916) 414-6563.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Norris", written in a cursive style.

for

Jennifer M. Norris
Field Supervisor

cc:

Jeff Koschak, Corps, Sacramento, CA

Matt Davis, Corps, Sacramento, CA

Jenny Marr, CDFW, Chico, CA

Jennifer Haire, ICF, Sacramento, CA

Literature Cited

- California Natural Diversity Database (CNDDDB). 2013. Natural Heritage Division, California Department of Fish and Game. Sacramento, California.
- U.S. Fish and Wildlife Service (Service). 1999a. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California.
- _____. 1999b. Draft Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*). U.S. Fish and Wildlife Service, Portland, Oregon. x + 192 pp.
- _____. 2006. Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California.
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